Chimney Rock National Monument Management Plan

Draft Environmental Impact Statement

Pagosa and Columbine Ranger Districts, San Juan National Forest
Archuleta County, Colorado

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United States Department of Agriculture
Forest Service

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*Photo of Great House Pueblo with Chimney Rock and Companion Rock in the background. Photo by Mark D. Roper.

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List of Commonly Used Acronyms

BA	Biological Assessment
BE	Biological Evaluation
BMP	Best Management Practice
CDPHE	Colorado Department of Public Health and Safety
CFR	Code of Federal Regulations
CRIA	Chimney Rock Interpretive Association
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FS	Forest Service
FSH	Forest Service Handbook
FMP	Fire Management Plan
FSM	Forest Service Manual
GIS	Geographic Information System
GMU	Game Management Unit
IMPLAN	Impact Analysis for Planning
KOP	Key Observation Point
LRMP	Land and Resource Management Plan
MA	Management Area
MBTA	Migratory Bird Treaty Act
MOU	Memorandum of Understanding
MSO	Mexican Spotted Owl
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NFS	National Forest System
NFSR	National Forest System Road
NFST	National Forest System Trail
NHPA	National Historic Preservation Act
NOI	Notice of Intent
NVUM	National Visitor Use Monitoring
PL	Public Law
ROD	Record of Decision
ROS	Recreation Opportunity Spectrum
ROW	Right-of-Way
SIO	Scenic Integrity Objective
SJNF	San Juan National Forest
SUIT	Southern Ute Indian Reservation
USC	United States Code
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service

Chapter 1 – Purpose and Need

1.1 Overview of the Environmental Impact Statement

The Forest Service (FS) has prepared this Environmental Impact Statement (EIS) in compliance with the National Environmental Policy Act (NEPA) and other relevant federal laws and regulations. This EIS discloses the potential environmental consequences that may result from the adoption of a management plan for the Chimney Rock National Monument (the Monument). The purpose of the management plan is to 1) describe desired conditions, objectives, and strategies to guide management, and 2) determine resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management (36 CFR 219.1(b) – 1982). This management plan is a non-significant amendment to the 2013 San Juan National Forest and Proposed Tres Rios Field Office Land and Resource Management Plan (LRMP). It will replace the existing management area direction for the Monument found in Section 3.17 of the LRMP. This plan amendment applies to all future projects or activities, so the objection process established in 36 CFR 219 Subpart B applies to the plan amendment portion of the decision (36 CFR 219.59(b)).

This EIS also discloses the potential environmental consequences that may result from the implementation of several specific projects within the Monument, as well as the adoption of specific prohibitions. These specific projects and prohibitions are being analyzed in response to comments received during the scoping period. The review process described in 36 CFR part 218 will apply to the project part of the decision (36 CFR 219.59(b)).

This EIS is arranged as follows:

Environmental Impact Statement – The EIS describes the Proposed Action (Alternative B) and other alternatives, and analyzes and discloses the environmental impacts of the Proposed Action and other alternatives. The EIS includes the following:

- **Chapter 1 – Purpose and Need:** This chapter provides a brief background of the planning area. It describes the purpose and need for the actions, the planning process, and related plans and relevant policy. This chapter also summarizes how the Forest Service informed and involved the public.
- **Chapter 2 – Alternatives:** This chapter describes potential management approaches or "alternatives" and discusses the process that has been used to develop alternatives. It describes three alternative land use plans, including the No Action Alternative (Alternative A) and the Proposed Action.
- **Chapter 3 – Affected Environment and Environmental Consequences:** This chapter describes the current physical, biological, human, and land use environments of the planning area (the affected environment). This description provides a baseline against which to compare the impacts of the alternatives. The baseline described in this chapter represents environmental and social conditions and trends in the planning area at the time this document was prepared. In addition,

this chapter evaluates how, and to what extent, baseline conditions would be altered by the alternatives. These changes are disclosed as the environmental consequences.

- **Chapter 4 – List of Preparers:** Chapter 4 provides a list of preparers.
- **Chapter 5 – References:** This chapter provides full citation information for all references, published and unpublished, cited in this document and used in developing the EIS. A glossary of definitions of frequently used terms follows the references cited.

Management Plan - The management plan includes components (desired conditions, objectives, standards, guidelines, etc.) that would apply across all alternatives with the exception of Alternative A.

1.2 Introduction and Background

The Chimney Rock National Monument is located in Archuleta County in southwestern Colorado. The Monument encompasses approximately 4,726 acres of land administered by the San Juan National Forest in two distinct areas: the Chimney Rock area, and the Peterson Ridge area. The vicinity map in Figure 1 displays the location of the Monument relative to its location within the San Juan National Forest.

The Chimney Rock National Monument is recognized as an important archaeological resource dating to the Pueblo II era (roughly 900 -1150 A.D.). Within the Monument boundaries, 167 sites and structures have been identified, and many more are believed to exist. In addition to being the northeastern-most Chacoan outlier, the site is recognized as one of North America's foremost archaeoastronomical resources. Many native peoples hold Chimney Rock to be an important place of cultural continuity. It is a living landscape that shapes those who visit it and brings people together across time.

Under Section 2 of the Antiquities Act of June 8, 1906 (34 Stat. 225, 16 U.S. Code [USC] 431), the President can establish as National Monuments "*historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated upon the lands owned or controlled by the Government of the United States.*" On September 21, 2012, Chimney Rock National Monument was established by Presidential Proclamation Number 8868, which states:

> *"The Chimney Rock site in southwestern Colorado incorporates spiritual, historic, and scientific resources of great value and significance... The Chimney Rock site also includes nationally significant archaeology, archaeoastronomy, visual and landscape characteristics, and geological and biological features, as well as objects of deep cultural and educational value."*

Currently, the Monument is managed using guidance found in the 2012 proclamation and the 2013 LRMP. However, the proclamation requires that a management plan be prepared specifically for the Monument. The proclamation states:

> *"The Secretary shall prepare, within 3 years of the date of this proclamation, a management plan for the monument, and shall promulgate such regulations for its management as deemed appropriate. The plan will provide for protection and interpretation of the scientific and historic objects identified [in the proclamation], and continued public access to those objects, consistent with their protection. The plan will protect and preserve access by tribal members for traditional cultural, spiritual, and food-*

and medicine- gathering purposes, consistent with the purposes of the monument, to the maximum extent permitted by law."

The scientific and historic objects identified in the proclamation include:

- **Cultural Resources** – The Monument contains nationally significant archeological sites, with a total of 167 known prehistoric sites and structures within eight major site groups, or communities, including the highest ceremonial "great house" in the Southwest occurring at an elevation of 7,600 feet. The Monument is also one of the best recognized archaeo-astronomical resources in North America, with virtually all building clusters having views of Chimney Rock and Companion Rock which frame multiple astronomical alignments and illustrate the Ancestral Puebloans' knowledge of astronomy.
- **Cultural Values** – The Chimney Rock area holds deep spiritual significance for modern pueblo and tribal communities. Descendants of the Ancestral Puebloans return to this important place of cultural continuity to visit their ancestors and for other ceremonial and traditional purposes. The area also contributes to our knowledge about the Ancestral Puebloans and their understanding and command of their environment, and affords opportunities to understand how geology, ecology, and archaeology interrelate. The features of the Monument also provide recreation opportunities to visitors from near and far.
- **Visual and Landscape Characteristics** – The two soaring rock pinnacles, Chimney Rock and Companion Rock, dominate the dramatic landscape of the Monument, rising hundreds of feet from the valley floor to an elevation of 7,900 feet. The ridgelines leading to the rock pinnacles and the Peterson Ridge area both offer spectacular views of the Monument and surrounding landscape.
- **Biological Features** – Biological features are also significant landscape characteristics and include wildlife species such as peregrine falcons that nest on Companion Rock, mule deer and elk that migrate through the area each fall and spring and live there during the critical winter months, as well as the many other wildlife species and habitats present in the Monument. The diversity of vegetation within the Monument, ranging from ponderosa pine and mixed conifer forests to desert grasslands and rare cactus species, are also important objects of the Monument.
- **Economic Opportunities** – The lands within the Monument are part of a larger area that helps support a growing travel and tourism sector that is a source of economic opportunity for the community, especially businesses in the region. This helps attract new residents, retirees, and businesses that will further diversify the local economy.

In addition to the requirements in the proclamation, this project will satisfy Objective 3.17.4 in the LRMP which states a comprehensive management plan for the Chimney Rock National Monument shall be developed within 3 years. As such, this management plan is one step in implementing the Forest Plan, as required by the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA, P.L. 93-378) and the National Forest Management Act of 1976 (NFMA, P.L. 94-588).

1.3 Purpose and Need

The need for the management plan is to provide direction and guidance for the management of the 4,726 acres of National Forest System (NFS) lands within the Chimney Rock National Monument, which will satisfy requirements as stated in the proclamation. In addition, there is a need to address the inadequate visitor facilities currently provided at the Monument. Specifically, the current visitor cabin and parking areas are not adequate to support visitors during high visitation days, special events, or projected future visitation numbers, and there are inadequate visitor shelters available in the upper mesa area to provide shade and/or shelter during storms. In addition, there is a need to implement specific prohibitions and restrictions for the protection of the resources and objects of the Monument.

The purpose of developing the management plan and proposing specific projects, prohibitions and restrictions is to ensure that public lands, resources, and objects of the Monument are managed in accordance with the intent of the Presidential Proclamation that established the Monument, as well as all applicable laws, policies, and regulations.

1.4 Scope and Applicability

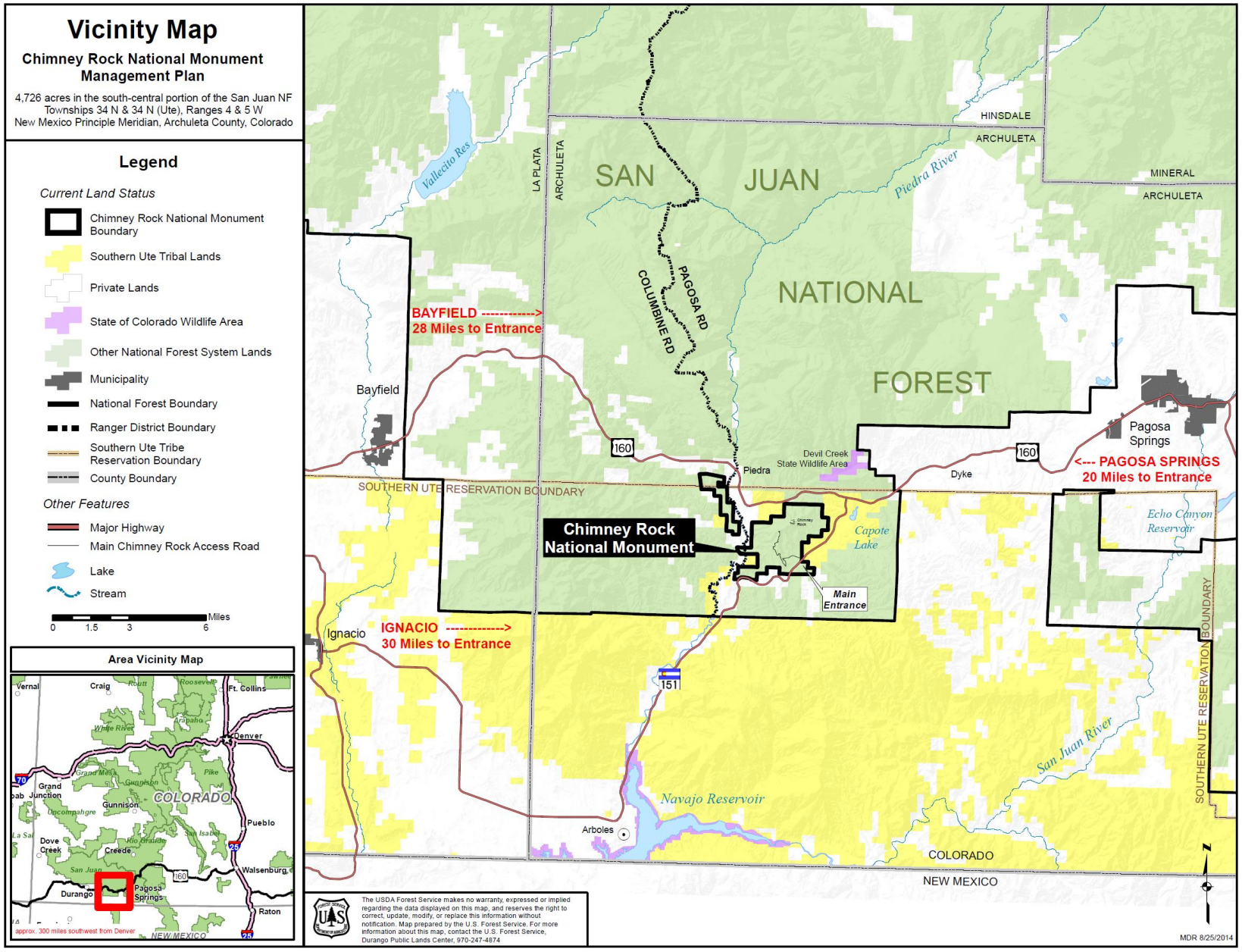
The scope of this EIS consists of the proposed action, range of alternatives, and potential impacts that are considered relevant. Each alternative includes adoption of a broad-scale, programmatic management plan as well as authorization of several specific projects. The management plan components (objectives, standards, guidelines, etc.) listed in the management plan describe the environmental protection measures that would be applied at both the programmatic level and to the specific projects and actions being considered in this EIS. These plan components will supersede the plan components listed in Chapter 3, Section 3.17 of the LRMP on pages 213-214. The projects and actions that are part of the alternatives include:

- Construction of an interpretive trail(s) near the current visitor center
- Construction of new visitor facilities, additional parking, and visitor shelters within designated building envelopes [1] (Figure 5)
- Analysis of livestock grazing in the Peterson Ridge portion of the Monument
- Analysis of specific prohibitions and restrictions

This EIS analyzes the impacts of both the programmatic management plan and the specific projects listed above. Before authorizing any specific project or land-use activity within the Monument (other than those listed above), the Forest Service must complete a more detailed and site-specific environmental analysis, pursuant to the NEPA and its implementing regulations. When a specific project or activity is proposed on NFS land, additional public involvement occurs, site-specific effects are analyzed, and decisions are made regarding specific projects and other activities. The Chimney Rock Management Plan and associated EIS apply to all NFS lands within the boundaries of the Chimney Rock National Monument.

[1] Four building envelopes were designated (refer to Figure 5) to provide options regarding where visitor facilities, additional parking areas, and visitor shelters may be located. This allows site planners to take various conditions within the building envelopes into account when planning for exact facility location, such as reducing impacts to previously undocumented cultural resources, reducing impacts to visuals, and ease of construction. Once clearances for cultural resources and special status plant and wildlife species are completed within the building envelopes, site specific locations for facilities within the building envelopes will be chosen and the appropriate level of environmental analysis, if any, will be completed.

Figure 1: Vicinity Map



1.5 Public Involvement

Public involvement regarding the development of a management plan for the Chimney Rock National Monument is ongoing.

During the scoping period for this project, the Forest Service solicited public involvement on the development of the Chimney Rock Management Plan from a broad range of participants, including public agencies, tribes, and private organizations and individuals. The USFS met and consulted with various federal, state, tribal, and local agencies throughout the scoping process. The USFS also conducted one public open house during scoping, released public notices in local and regional newspapers, and solicited comments through direct mailings to interested individuals, all in an effort to keep interested parties informed and to solicit opinions and input germane to management of the Monument. Discussions were also held with the Chimney Rock Interpretive Association (CRIA), members of the Archuleta County Board of County Commissioners, representatives of the Town of Pagosa Springs, and the Pagosa Springs Chamber of Commerce.

The Forest Service will continue to solicit public involvement throughout the comment period by conducting open houses, publishing public notices in local and regional newspapers, and soliciting comments through direct mailings to interested individuals.

1.6 Tribal Consultation

In accordance with NEPA, the National Historic Preservation Act (NHPA), and Executive Order (EO) 13007, the USFS initiated consultation with the 26 pueblos and tribes culturally affiliated and traditionally associated with the SJNF since the initiation of the management planning effort. All 26 pueblos and tribes were informed of the process and were offered a visit from agency officials to gather input and provide further information about the creation of a management plan for the Monument. The 26 pueblos and tribes affiliated with lands managed by the SJNF are:

Jicarilla Apache Nation
Kewa Pueblo
Navajo Nation
Ohkay Owingeh
Pueblo of Acoma
Pueblo of Cochiti
Pueblo of Isleta
Pueblo of Jemez
Pueblo of Laguna
Pueblo of Nambe
Pueblo of Picuris
Pueblo of Pojoaque
Pueblo of San Felipe
Pueblo of San Ildefonso
Pueblo of Sandia
Pueblo of Santa Ana
Pueblo of Santa Clara
Pueblo of Taos
Pueblo of Tesuque
Pueblo of Zia
Southern Ute Indian Tribe
The Hopi Tribe
Uintah and Ouray Ute Indian Tribe
Ute Mountain Ute Tribe
Ysleta del Sur Pueblo
Zuni Tribe

During the course of the planning process there were multiple face to face meetings with several of the pueblos and tribes, in addition to letters updating all 26 pueblos and tribes on the progress of the management plan and inviting them to consult. Tribal consultation is ongoing. Consultation efforts to date are summarized in Appendix B and in the project record.

1.7 Planning Issues

Planning issues were identified and defined through the results of tribal consultation, agency, public, and internal scoping, and an analysis of current land use and management in the Monument. These issues were taken into account during the formulation of alternatives and guided the development of the management plan. The five main issues derived from the process are described below:

Issue 1: Recreation Opportunities

A common theme in many of the comments received during scoping was an interest in providing improved facilities, such as a larger visitor center, additional restrooms, secure storage, visitor shelters to provide shade and/or shelter during storms, and a source for water at the site. A desire to enhance and expand the trail system within the Monument, and an interest in improved parking, traffic management and road conditions were also expressed. Currently, there is one road that leads from the entrance gate to the upper mesa area. Visitor services are confined to a small visitor cabin, parking area, and restrooms near the entrance, and a parking area with restrooms on the upper mesa. There are also two trails on the upper mesa totaling less than 1 mile. The current facilities are not adequate to support the current number of visitors during high visitation days and special events, or to support projected future visitation numbers. In addition, there are inadequate visitor shelters available in the upper mesa area to provide shade and/or shelter during storms. How additional improvements can be made at the Monument while retaining the rustic, quiet nature of the site and preserving a quality visitor experience at the Monument was also a concern. Specific concerns about the impacts of increased use of the Monument, such as creating more trash, attracting bears to the area, and expanding septic systems were also raised.

Issue 2: Research

Interest in maintaining the ability to conduct archeological research within the Monument is high. There was also interest in continuing to conduct wildlife-related research.

Issue 3: Management of Resources

General concerns were raised that development of new facilities and increased use of the area may cause damage or create environmental degradation. There were also many specific comments focused on the following resources:

Archeological Resources: The protection and management of the Monument's cultural and archaeological resources on a landscape scale was raised as a concern, along with the need to stabilize specific archeological sites within the Monument and increase interpretive opportunities.

Scenic and Auditory Resources: Interest in preserving the scenic resource, protecting the sound landscape, and protecting the night sky environment, thus preserving a quality visitor experience at the Monument, were raised as concerns.

Biological Resources: Concerns regarding how management activities will impact peregrine falcons, deer and elk winter range and winter concentration areas, deer and elk calving grounds, and other native flora and fauna were raised. There was also an interest in continuing habitat improvement projects for wildlife.

Issue 4: Management of Valid Existing Rights and Other Existing Uses

How valid existing oil and gas leases, private minerals under Forest surface, and the other existing uses such as livestock grazing, utility lines, and private roads and ditches within the Monument will be managed, while still protecting the objects of the Monument, was brought up as a concern.

Issue 5: Cultural and Tribal Concerns

Continued access to the Monument for traditional, cultural and ceremonial uses, and for food and medicine gathering is of high importance to tribes. Tribes also requested that the Forest Service consult with them regarding the development of interpretation of the Monument. Tribes expressed a strong interest in ensuring that interpretive information provides visitors and tribal members with an understanding and appreciation of the importance of the Chimney Rock landscape and its ancestral sites to native people, and that their tribal perspectives are included in the interpretation. Tribes also expressed concern that visitation and interpretation of the site be balanced with proper respect for the site.

In addition to the issues described above, many of the comments received were operational in nature, such as suggestions regarding how artifacts should be catalogued, or suggestions for interpretive tours or displays. These types of comments are more appropriately addressed independent of this management plan, such as in an interpretive plan or operating plan. Other issues are already decided by law, regulation, or higher level decision. These included topics such as private water rights, which is covered under state law. There were also numerous comments raised that are beyond the scope of this management plan, such as designation of the area as a World Heritage Site, or the availability of funds to manage the Monument. A summary of the scoping effort, including a list of all comments raised during the scoping process, is found in the project record.

1.8 Applicable Laws

A broad range of federal policies, decisions, and laws guide development of this management plan and EIS. Key laws with bearing on the decision are listed below, and are discussed in more detail in Chapter 1 of the LRMP. Additional planning guidance is included in several EOs, agency manuals and handbooks, policy memorandums, and regulations and laws where applicable.

Federal Land Policy Management Act of 1976
National Forest Management Act of 1976
National Environmental Policy Act of 1969
Multiple-Use and Sustained-Yield Act of 1960
The Migratory Bird Treaty Act of 1966
Mineral Leasing Act of 1920, as amended
Mining and Minerals Policy Act of 1970
Federal Onshore Oil and Gas Leasing Reform Act of 1987
Clean Air Act of 1963
Clean Water Act of 1972
Endangered Species Act of 1973
The National Historic Preservation Act
The Brunot Agreement
Energy Policy Act of 2005
Energy Security Act of 1970

Chapter 2 – Alternatives

This chapter describes the three alternatives considered in detail in the EIS. It also compares alternatives and describes alternatives dismissed from detailed study. Maps associated with each alternative are shown in Figures 2, 3, and 4.

2.1 Development of Alternatives

Currently, the Chimney Rock National Monument falls under Management Area (MA) 2, which emphasizes special areas and designations. As described in the 2013 LRMP, MA2 areas are managed in order to protect or enhance their unique characteristics. The Chimney Rock Management Plan will further refine the direction for the Monument currently found in Section 3.17 of the LRMP. As a first step towards refining this direction, the planning team gathered information about existing visitor use and the condition of the Monument's facilities and resources, and considered which areas attract visitors and which areas have sensitive resources. Using that information, the team divided the Monument into zones which identify the range of potential resource conditions, visitor experiences, and facilities that may be found within an area. These zones are shown in Figure 3 and Figure 4. The resource conditions, visitor experience, and facilities that are appropriate in each zone are described below.

Zone 1: Emphasis in this area is on the cultural and natural environment. Preserving the integrity of the landscape setting, scenic resources, and the ability to experience the natural world would be priorities. Management activities would occur to protect and manage the objects of the Monument, and could include prescribed burning, habitat and ecosystem restoration, and other vegetation management activities. Activities that compromise the long-term scenic resource or do not fit within the landscape setting would be discouraged. Visitor access would be primarily along primitive trails or cross country. Development of recreational opportunities in this area would generally consist of unobtrusive interpretive signs and natural surface trails compatible with the landscape setting. Emphasis would be on self-guided experiences, but guided tours may also be available.

Zone 2: Emphasis in this area is on visitor use and interpretive services. Providing information and visitor services would be a priority. Management activities would occur to protect and manage the objects of the Monument, help enhance the visitor experience, facilitate visitor use and interpretation of the area, protect cultural sites and facilities from damage, and address public safety concerns. The natural/rustic character of the site would be considered in the design of facilities and improvements in this area, but visitors can still expect to see a wide range of human activities, development, and visitor service facilities in this area. Regulatory and interpretive signs would be common. Emphasis would be on guided tour experiences, but self-guided tours would also be available.

Different alternatives were created by varying the location and size of these zones across the landscape. Each alternative was developed to be consistent with the proclamation, address the purpose and need, respond to the issues identified during the scoping period, and to comply with all applicable federal, state, and local laws and regulations. An alternative comparison table at the end of this chapter summarizes the major differences between the alternatives.

2.2 Alternatives Considered in Detail

Three alternatives were analyzed in detail and are described below.

Alternative A (No Action)

Alternative A represents the continuation of management direction found in the 2013 LRMP. This alternative serves as a baseline for comparing and contrasting the impacts of the other alternatives. The objects of the Monument would be protected using direction found in the proclamation and the LRMP. The No Action Alternative is based on reasonable foreseeable actions, existing planning decisions and policies, and existing land use allocations and programs. The maximum operating season[2] under this alternative is from May 15 to September 30.

Current facilities under Alternative A include:

- A 288 square foot visitor cabin at the lower area
- 1 toilet facility at the lower area and 1 at the upper mesa area
- Parking for 24 standard vehicles at the lower area
- Parking for 26 standard vehicles at the upper mesa area

Alternative B

Alternative B will amend the 2013 LRMP with direction found in the Chimney Rock Management Plan. This alternative offers the strongest protection to the archeological, biological, geologic, and visual objects of the Monument by focusing on the protection of the cultural and natural environment. Emphasis throughout most of the Monument would be on preserving the integrity of the landscape setting, scenic resources, and the ability to experience the natural world. Most visitor and interpretive services would be provided within a limited core area of the Monument where these activities are already occurring, although some limited expansion of visitor and interpretive services may occur. The maximum operating season under this alternative is from May 1 to October 31.

Alternative B also includes the following specific projects and activities:

- Construction of up to 1 mile of interpretive trail(s) near the current visitor center
- Construction of a visitor facility of up to 3,000 sq. ft. in building envelope 1
- Construction of additional parking area(s) and associated facilities within building envelope 1 and 2, sufficient to accommodate up to 30 standard vehicles, 10 oversized vehicles, 1 tour bus, and 3 shuttles (approximately 1½ acres would be disturbed to provide this additional parking)
- Construction of visitor shelter(s) within building envelope 3
- Construction of additional parking area(s) and associated facilities within building envelope 4 sufficient to accommodate up to 5 standard vehicles (disturbance of less than ½ acre)
- Closure of the Monument to dispersed camping
- Closure of the 826 acres of the Turkey Grazing Allotment that falls within the Monument

[2] The operating season is the time period when guided tours are offered and motorized vehicle access is allowed on the road leading to the upper mesa area. Public access is permitted outside of this operating season, but is limited to non-motorized access. Guided tours are also not available outside of the operating season.

Alternative C

Alternative C will amend the 2013 LRMP with direction found in the Chimney Rock Management Plan. This alternative balances the protection of the archeological, biological, geologic, and visual objects of the Monument with the desire to provide increased visitor and interpretive services and more developed access within a larger area of the Monument. Emphasis on preserving the integrity of the landscape setting, scenic resources, and the ability to experience the natural world would still apply to most of the Monument, but as compared to Alternative B, there would be more areas where visitor and interpretive services and developed access may be provided, including in the Peterson Ridge area and the area on the west side of the Monument bisected by the Piedra River. The maximum operating season under this alternative is from April 1 to November 30.

Alternative C also includes the following:

- Construction of up to 2 miles of interpretive trail(s) near the current visitor center
- Construction of a visitor facility of up to 4,500 sq. ft. in building envelope 1
- Construction of additional parking area(s) and associated facilities within building envelope 1 and 2, sufficient to accommodate up to 50 standard vehicles, 20 oversized vehicles, 3 tour buses, and 3 shuttles (approximately 2 acres would be disturbed to provide this additional parking)
- Construction of visitor shelter(s) within building envelope 3
- Construction of additional parking area(s) and associated facilities within building envelope 4 sufficient to accommodate up to 8 standard vehicles (disturbance of less than ¾ acres)
- Monument remains open to dispersed camping and the portion of the Turkey Grazing Allotment within the Monument remains open to grazing

2.3 Prohibitions Common to Alternatives B & C

In addition to the projects listed under the alternatives above, the following prohibitions will be applied to each alternative:

- Close approximately 400 acres surrounding Chimney Rock and Companion Rock to public entry from March 15 to July 31 (Figure 6), with the exception of use along the Great House Trail (NFST 632). This will minimize disturbance to peregrine falcons during breeding season.
- Prohibit rock climbing on Chimney Rock and Companion Rock by prohibiting public entry into the 3 acre area surrounding Chimney Rock and Companion Rock (Figure 6).
- Prohibit horses and dogs (with the exception of service dogs) on interpretive trails, including the Great Kiva Trail (NFST 699) and the Great House Trail (NFST 632) (Figure 6).
- Require dogs to be on leashes in all developed areas of the Monument.
- Prohibit over-snow vehicle use within the Monument.

2.4 Management Common to All Alternatives

This section describes the many aspects of management of the Monument that are defined in federal and state requirements, the establishing legislation, and in servicewide mandates and policies, and are therefore common to all alternatives analyzed in detail.

Federal and State Requirements

Management of NFS lands is governed by a variety of federal statutes, regulations, executive orders, and the Forest Service directive system (manuals and handbooks). In addition, some state laws and regulations apply on NFS lands within the State. The selection of any of the alternatives in this EIS would not affect the applicability of any federal or state requirements.

Presidential Proclamation

As required by the proclamation, the management plan will provide for the protection and interpretation of the scientific and historic objects identified in the proclamation, and continued public access to those objects, consistent with their protection. The plan will protect and preserve access by tribal members for traditional cultural, spiritual, and food and medicine gathering purposes, consistent with the purposes of the Monument, to the maximum extent permitted by law. Other specific direction given in the Presidential Proclamation includes:

Rights of Indian Tribes: Nothing in the proclamation shall be deemed to enlarge or diminish the rights of any Indian Tribe.

Fish and Wildlife Management: Nothing in the proclamation shall be deemed to enlarge or diminish the jurisdiction of the State of Colorado with respect to fish and wildlife management.

Motorized and Mechanized Vehicle Use: According to the proclamation, all motorized and mechanized vehicle use shall be limited to designated roads, except for emergency or authorized administrative purposes.

Livestock Grazing Permits and Leases: According to the proclamation, laws, regulations, and policies followed by the Forest Service in issuing and administering grazing permits or leases on all lands under its jurisdiction shall continue to apply with regard to the lands in the Monument.

Vegetation Management Treatments: Vegetation management treatments may be carried out within the Monument, except that timber harvest and prescribed fire may only be used when it is determined to be appropriate to address the risk of wildfire, insect infestation, or disease that would endanger the Monument or imperil public safety.

Existing Withdrawals, Reservations, or Appropriations: Nothing in the proclamation shall be deemed to revoke any existing withdrawal, reservation, or appropriation; however, the National Monument shall be the dominant reservation.

Valid Existing Rights

The Monument was established subject to valid existing rights including existing oil and gas leases, and existing water rights.

Reserved and Outstanding Rights

Under all alternatives, the reasonable exercise of reserved or outstanding rights for access, occupancy, and use of NFS lands within the Monument would not be affected. The rights include those that exist by law, treaty, or other authority, including land uses protected by Native American treaty rights such as the Brunot Agreement.

The Brunot Agreement, ratified by Congress in 1874, withdrew over 5,000 square miles in the mountains of southwest Colorado from the 1868 Ute Reservation. The agreement, entered into between the United States (as represented by Felix Brunot) and the Ute Indians in Colorado, was passed into law (18 Stat., 36) by the House of Representatives and the Senate of the U.S. Congress on April 29, 1874. Under the "reserved rights doctrine," hunting rights on reservation lands relinquished by the Utes were retained; that is, the tribes retained such rights as part of their status as prior and continuing sovereigns. Article II of the Bruno Agreement specified "the United States shall permit the Ute Indians to hunt upon said lands so long as the game lasts and the Indians are at peace with the white people." The Ute Mountain Ute Tribe's hunting rights were acknowledged when the tribe sued the State of Colorado for their historical hunting rights in 1978. The rights were granted to the tribe under a consent decree that gave enrolled members of the Ute Mountain Ute Tribe the right to hunt deer and elk in the Brunot area for subsistence, religious, or ceremonial purposes. The consent decree specified that tribal members may hunt deer and elk without a state license year-round, providing that they obtain a tribal hunting permit. In 2013, the Ute Mountain Ute Tribe re-negotiated this agreement with the State of Colorado to include the Tribe's fishing rights and the right to hunt a certain number of black bears, moose, mountain goats, big horn sheep and mountain lions, in addition to the existing take of elk and mule deer within the Brunot area. Other game animals may be hunted without a license and without bag limits, but only during hunting seasons established by Colorado Parks and Wildlife (CPW). In 2008, the Southern Ute Indian Tribe signed an agreement with the State of Colorado which reinstated their hunting and fishing rights within the Brunot area. The SJNF will continue to ensure that the hunting and fishing rights of the 1874 Brunot Agreement are upheld on public lands under their management jurisdictions, including those lands within the reservation exterior boundary such as the Chimney Rock National Monument. In exercising their Brunot hunting rights, the Ute Mountain Ute and Southern Ute tribal members are required to adhere to federal policy and regulations designed to protect natural and cultural resources, including direction from the Chimney Rock Management Plan designed to protect the objects of the Monument.

Land Use Authorizations

This plan does not specifically authorize or prohibit any specific land use authorizations. "Authorizations" refer to land uses allowed under a special use permit, easement, lease, contract, or similar legal instrument. Numerous types of lands and recreation-related authorizations are issued for occupancy and use of NFS lands. Examples include, but are not limited to:

- Permits to operate facilities and provide interpretive tours
- Tribal and noncommercial group use
- Temporary events
- Oil and gas monitoring wells, gas pipelines, powerlines, telephone lines , ditches, water pipelines
- Outfitting and guiding for hunting, fishing, camping, horseback riding, rafting, etc.
- Commercial filming and still photography
- Road use and Research

These uses may be authorized at a later date if they are determined to be an appropriate use of NFS lands, are consistent with the proclamation and Chimney Rock Management Plan, and after the appropriate level of environmental analysis has been completed.

2.5 Alternatives Considered but Eliminated From Detailed Study

NEPA regulations require federal agencies to explore and evaluate all reasonable alternatives to a proposed action and to briefly discuss the reasons for eliminating alternatives from detailed study (40 CFR 1502.14). The deciding official reviewed and weighed the following alternatives during the analysis process. Therefore, the eliminated alternatives contribute to the range of reasonable alternatives and a reasoned choice, even though they were eliminated from detailed study. The following list describes the alternatives considered but eliminated from detailed study and the reason(s) why these alternatives were eliminated from detailed study.

Decreased Access to Peterson Ridge – This alternative would have prohibited access to Peterson Ridge through an area closure with the intent of preventing damage to the archeological resources found in the area. This option is essentially represented in the monitoring and adaptive management options provided in Chapter 3 of the management plan which would require monitoring of the Peterson Ridge area. If damage to the archeological resources is detected during monitoring, several strategies are available to mitigate this damage, up to and including the closure of the area to public entry. Therefore, this alternative was eliminated from detailed study to eliminate redundancy in the analysis.

Project Specific Proposals – In addition to the specific project proposals being included in the proposed action, there were many other specific proposals that were considered. These included activities such as construction of additional trails, prescribed burning, fuels reduction projects, winter habitat improvement projects, pest-control projects, construction of range improvements, and issuance of special use permits. It was determined that these specific projects would be addressed under site specific NEPA at a later date due to time constraints and a lack of necessary project-specific information at this time. This alternative was therefore eliminated from detailed analysis.

Closure of the Monument to Mineral Development – This alternative would prohibit development of existing oil and gas leases within the Monument boundary. However, direction in the proclamation allows for the development of valid existing rights. Therefore, this alternative would contradict direction given in the proclamation, and would give rise to regulatory taking claims under the Fifth Amendment. Therefore, this alternative was eliminated from detailed study.

2.6 Comparison of Alternatives

Table 1 below shows the major differences by alternative.

Table 1: Comparison of Alternatives

	Alternative A	Alternative B	Alternative C
Emphasis of Alternative	Compliance with proclamation and LRMP	Compliance with proclamation. Amend LRMP to include Chimney Rock Management Plan. Provide strongest	Compliance with proclamation. Amend LRMP to include Chimney Rock Management Plan. Provide for balanced

		protection for the objects of the Monument by focusing on protection of the cultural and natural environment	protection of the objects of the Monument with increased visitor and interpretive services
Acres in Management Zone 1 (emphasizing the cultural & natural environment)	na	4,289 acres	3,091 acres
Acres in Management Zone 2 (emphasizing visitor & interpretive services)	na	437 acres	1,635 acres
Visitor Facility	Maintain Current Visitor Cabin	Construct visitor facility of up to 3,000 sq. ft.	Construct visitor facility of up to 4,500 sq. ft.
Maximum Operating Season and Public Motorized Use	May 15-Sept. 30	May 1-Oct. 31	April 1-Nov. 30
Additional Parking Areas in Lower Area	No additional parking. Retain current parking to accommodate 24 standard vehicles	Retain current parking, and construct additional parking to accommodate 30 more standard vehicles, 10 oversized vehicles, 1 tour bus, and 3 shuttles	Retain current parking, and construct additional parking to accommodate 50 more standard vehicles, 20 oversized vehicles, 3 tour buses, and 3 shuttles
Additional Parking Area near Current Entrance by Highway	No additional parking. Retain current parking in entry area	Retain current parking at entryway, and construct additional parking to accommodate 5 more standard vehicles	Retain current parking at entryway, and construct additional parking to accommodate 8 more standard vehicles
Miles of Additional Interpretive Trails	0 miles	up to 1 mile	up to 2 miles
Estimated capacity in Upper & Lower Parking Area	50 PAOT[3]s (upper) 60 PAOTs (lower)	50 PAOTs (upper) 215 PAOTs (lower)	50 PAOTs (upper) 400 PAOTs (lower)
Estimated number of acres disturbed for additional parking areas	0 acres (no change from current)	up to 1½ acres total in building envelopes 1 and 2, and less than ½ acre in building envelope 4	up to 2 acres total in building envelopes 1 and 2, and less than ¾ acre in building envelope 4
Dispersed Camping	Allowable	Prohibited	Allowable
Livestock Grazing	Allowable	Prohibited	Allowable
Visitor Shelters	None	Construct visitor shelters on upper mesa	Construct visitor shelters on upper mesa
Potential for Visitor and Interpretive Services on Peterson Ridge?	no	no	yes

[3] PAOT = Persons at one time

Figure 2: Alternative A

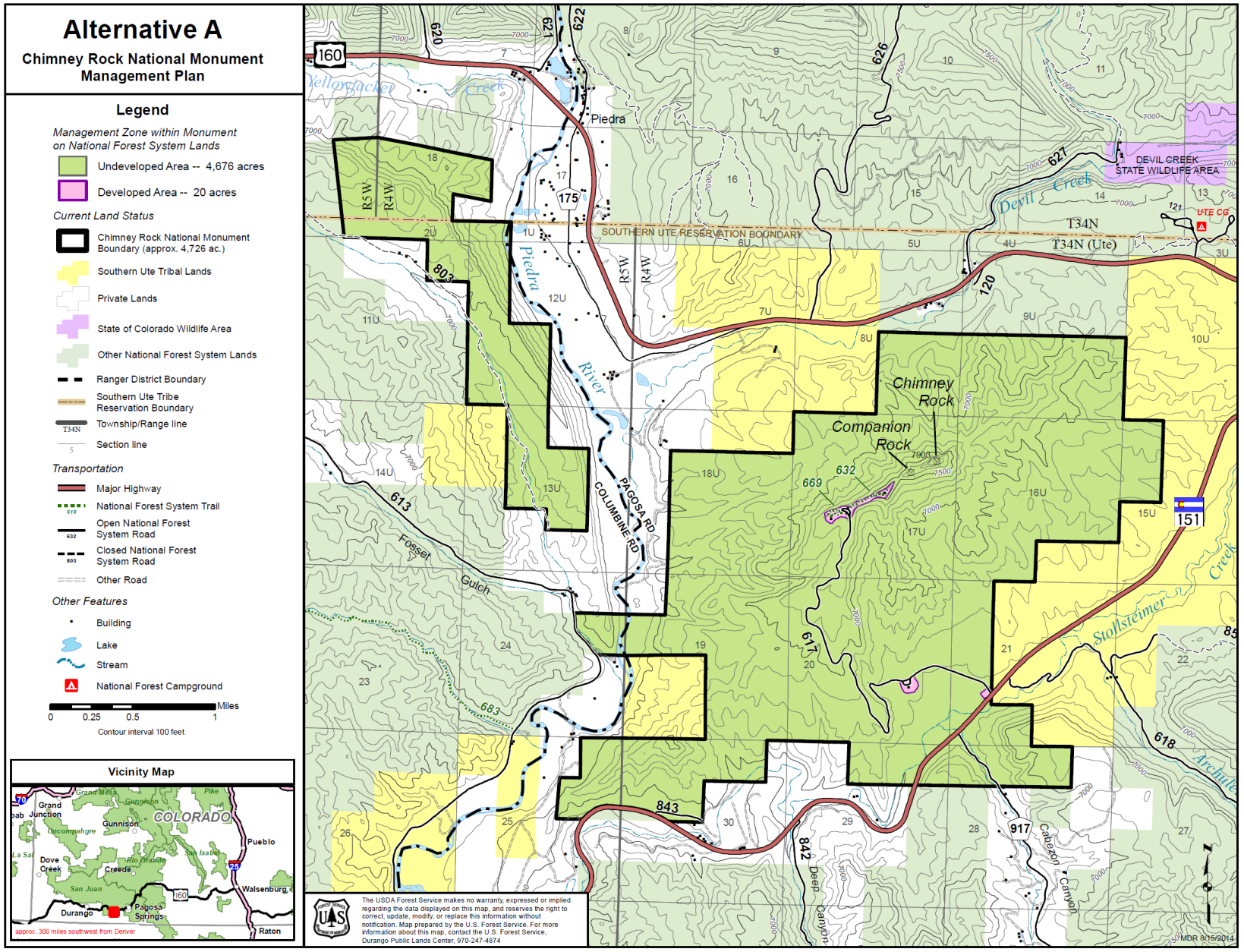


Figure 3: Alternative B

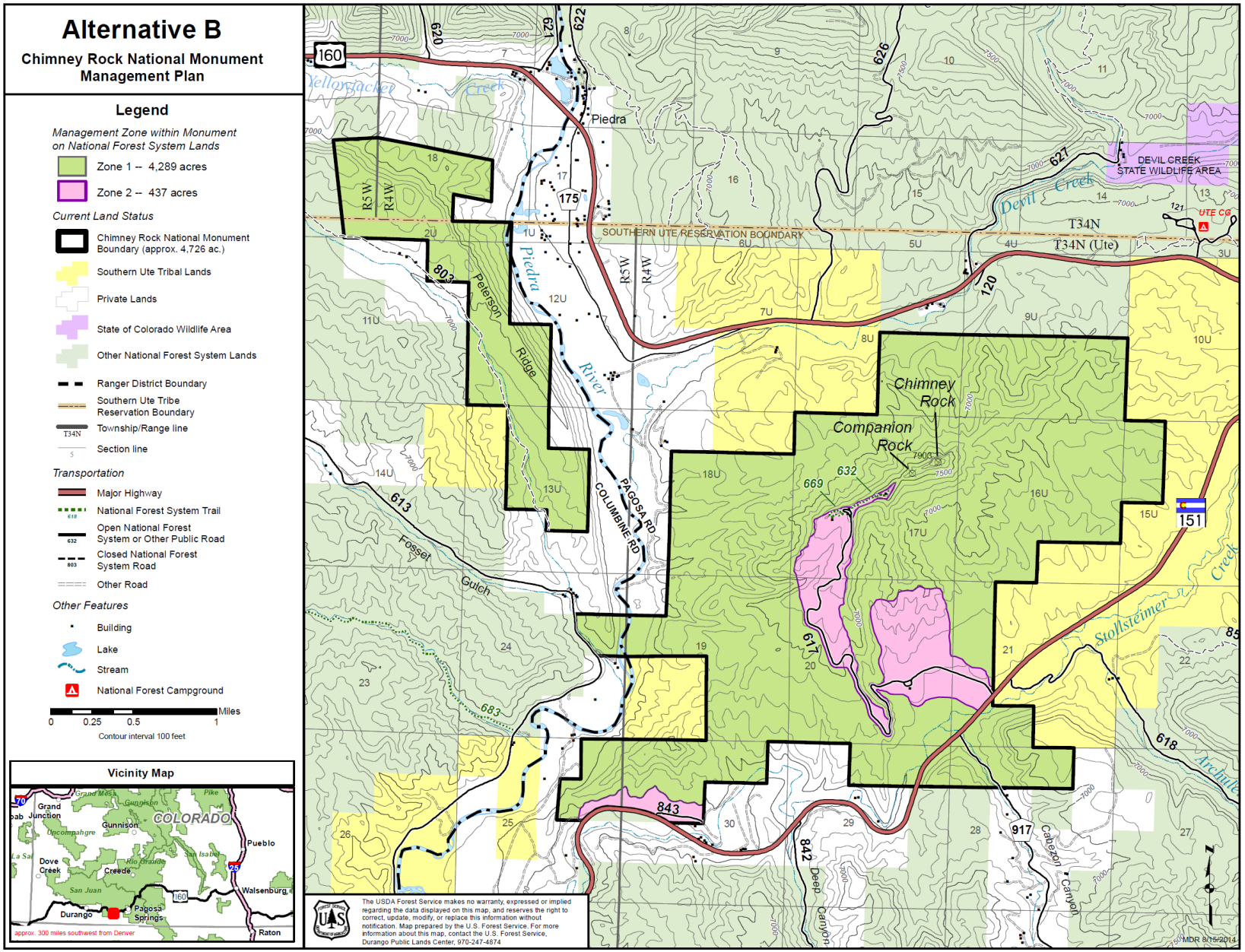


Figure 4: Alternative C

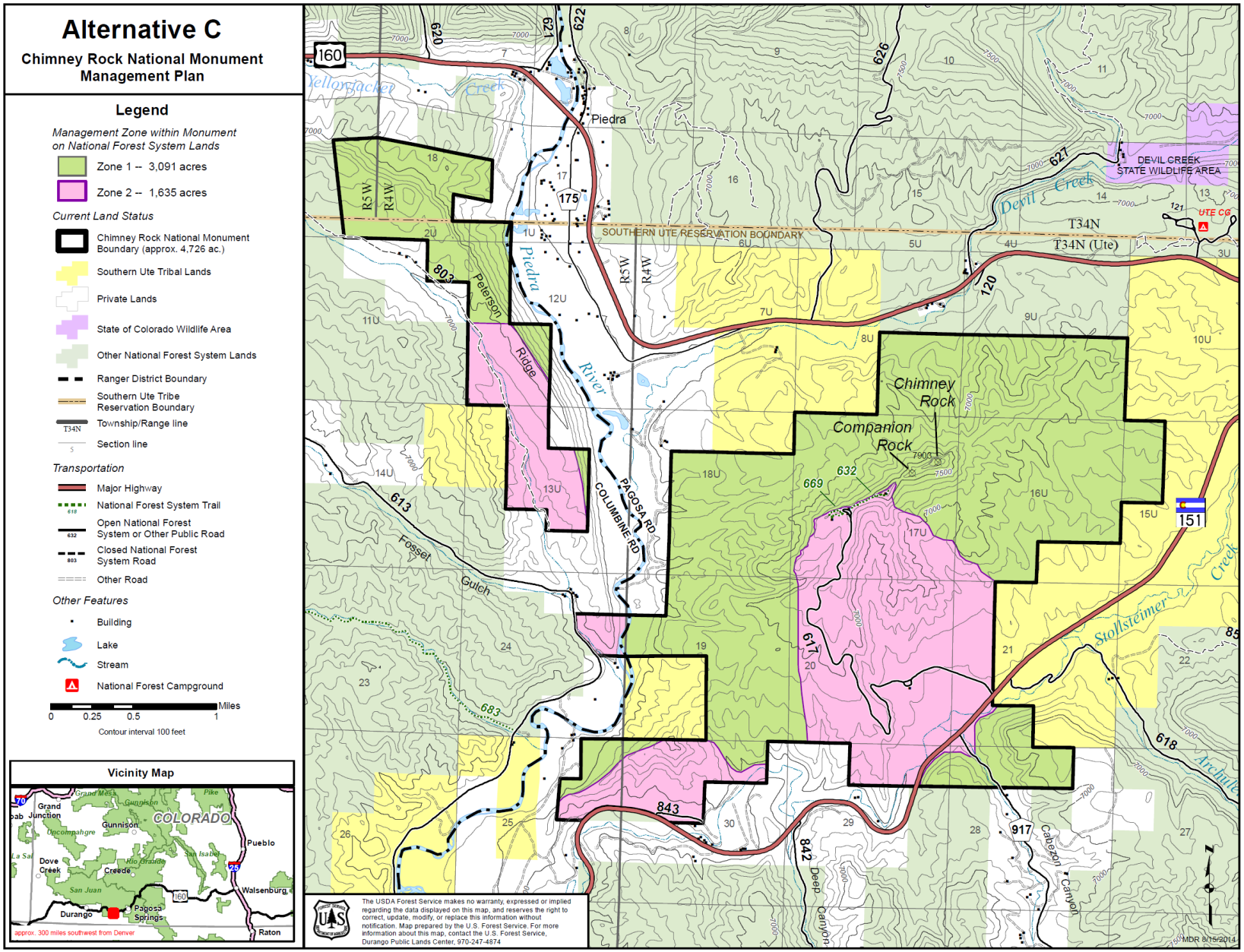


Figure 5: Location of Building Envelopes

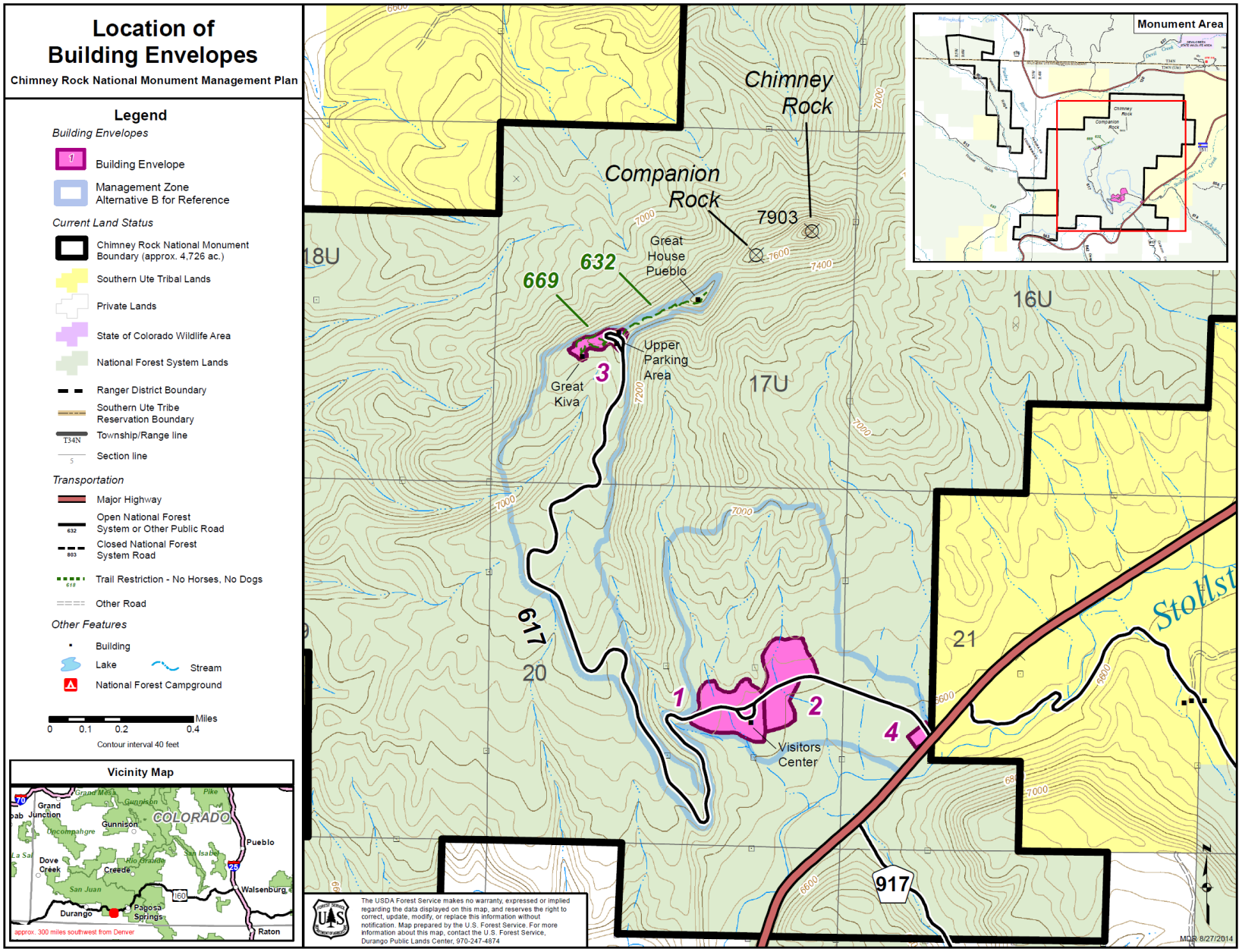
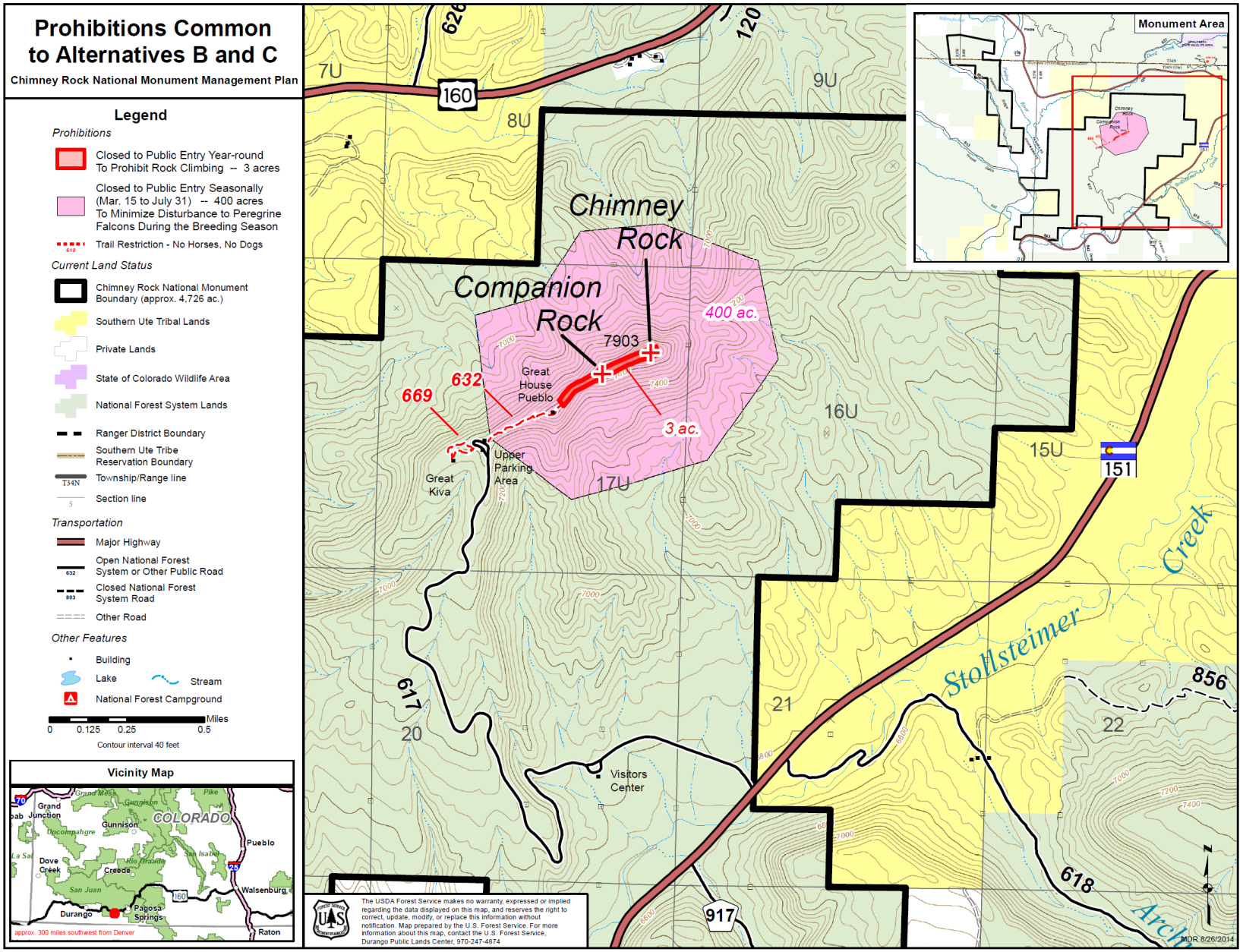


Figure 6: Prohibitions Common to Alternatives B and C



Chapter 3 – Affected Environment and Environmental Consequences

3.1 Introduction

Chapter 3 combines the affected environment and environmental consequences (described below). This chapter's purpose is to convey how each of the alternatives described in Chapter 2 is predicted to affect the natural and human environment.

Affected Environment

The current physical, biological, human, and land use environments of the planning area are discussed. This description provides a baseline against which to compare the impacts that might result from implementing any of the three alternatives.

Environmental Consequences

A description and comparison of the predicted environmental consequences of each of the three alternatives are discussed. This includes:

1) an assessment of impacts from implementation of the management plan for Chimney Rock National Monument;
2) an assessment of impacts from implementation of the various prohibitions listed in Section 2.3;
3) an assessment of impacts from approval of building envelopes where future facilities may be located; and
4) an assessment of impacts from changes to the operating season, livestock grazing, and dispersed camping.

If a particular allowable use or management action is not discussed for a particular resource, it is because no impacts are expected or the anticipated impact is considered of minor consequence. If unforeseen impacts are identified through the planning process, these will be addressed prior to the final decision.

The following types of impacts are included in the evaluation of environmental consequences:

- **Direct/Indirect Impacts:** These impacts result from activities that generally occur at the same time and place as the management activity or through an action causing the impact or that may occur at some distance or time from the action. For example, indirect impacts could occur days after the surface is disturbed, as well as some distance from the disturbance.
- **Short- or Long-term Impacts:** When applicable, the short- or long-term aspects of impacts are described. For purposes of this EIS, short-term impacts occur during or after the activity or action and may continue for up to 2 years. Long-term impacts occur beyond the first 2 years.
- **Cumulative Impacts:** This section considers the effects on the environment resulting from the incremental impact of the alternatives analyzed in detail, when added to other past, present, and

reasonably foreseeable actions and trends. Where no cumulative effects have been identified, such is noted.

For the cumulative effects analysis, unless otherwise stated, the spatial scale is the analysis area and the temporal scale is 20 years into the future. The past, present, and reasonable foreseeable future actions and trends considered in the cumulative effects analysis are described in the affected environment discussions for each resource section and/or within the cumulative effects narrative.

Relationship of this Management Plan to Other Planning Documents

This management plan will amend the current San Juan National Forest and Proposed Tres Rios Field Office Land and Resource Management Plan, approved in 2013. Specifically, the plan components listed in this management plan will supersede the plan components listed in Chapter 3, Section 3.17 of the LRMP on pages 213-214. The resource direction contained in Chapter 2 of the LRMP will continue to apply within the Monument unless specifically noted in the Chimney Rock Management Plan.

There are several federal, state, tribal, and local planning documents that influence management of lands in southwest Colorado. In the Chimney Rock area, this includes the 2005 Southern Ute Indian Tribe Comprehensive Master Plan and the 2012 Archuleta County Community Development Action Plan. A review of these plans did not identify any conflicts between the plans and the Chimney Rock Management Plan. An analysis of these plans is provided in Volume III, Appendix W of the 2013 LRMP.

Relationship between programmatic and site-specific analysis

This EIS analyzes both programmatic and site specific projects. The discussion below distinguishes how programmatic and site specific projects are analyzed in this EIS.

Programmatic Analysis

Management plan components (standards, guidelines, etc.) listed in the Chimney Rock Management Plan describe the environmental protection measures that would be applied in order to protect the objects of the Monument. The programmatic analysis discusses the environmental effects of implementing these management plan components on a broad scale and does not predict what would happen when such broad-based standards and guidelines are implemented on individual, site-specific projects. The actual effect (impacts) would depend on the extent of each project, the environmental conditions at the site, and the mitigation measures and their effectiveness. Future projects will tier to the programmatic analysis presented in this EIS. The concept of tiering is explained in the 2013 LRMP in Volume I, page 66.

Site-Specific Analysis

The site specific analysis looks at the short- and long-term environmental consequences of site-specific projects including the construction of visitor facilities and parking lots within designated building envelopes, the adoption of various prohibitions and restrictions, and the impacts of continuing or cancelling current livestock grazing within the Monument.

Lands Currently Leased for Oil and Gas Development

All 3,895 acres under federal mineral ownership have been withdrawn from mineral entry by the proclamation. However, the establishment of the Monument was subject to valid existing rights. There is

one existing lease within the boundaries of the Monument on which oil and gas development could occur. As stated in the proclamation, the FS and BLM *"shall manage development under existing oil and gas leases within the Monument, subject to valid existing rights, so as not to create any new impacts that would interfere with the proper care and management of the objects protected by this proclamation."* An analysis of impacts related to oil and gas development was completed and is included in the 2013 LRMP. This EIS tiers to that analysis. If any development is proposed on the existing lease in the future, site-specific NEPA analysis appropriate to the situation will be completed at that time.

Development on the 551 acres within the Monument under existing lease must be consistent with rights as granted under the existing lease. Applications for Permit to Drill (APDs) must be authorized through required procedures, including NEPA analysis appropriate to the situation. Development activities would be implemented in compliance with the lease stipulations, standard practices, applicable BMPs, guidelines for surface-disturbing activities, and applicable laws, standards, policies, and implementation plans, as well as with all USFS and BLM jurisdiction, policies, and regulations. This includes the application of all standards and guidelines contained in the Chimney Rock Management Plan.

Surface use restrictions, including timing limitations (TL), no surface occupancy (NSO), and controlled surface use (CSU) stipulations, as well as unavailable for leasing designations, cannot be retroactively applied to valid, existing oil and gas leases or use authorizations (e.g., APDs). Post-lease actions/ authorizations (e.g., APDs, road/pipeline ROWs), however, could be encumbered by conditions of approval (COAs) with effects similar to TL and CSU restrictions on a case-by-case basis, as required through project-specific NEPA analysis or other environmental review. Application of COAs to operations on existing leases must be in accord with the authority reserved by the terms and conditions of the lease.

Climate Change

All LRMP plan components related to climate change (summarized in Appendix G of the LRMP) will continue to apply within the Monument. These plan components include a variety of adaptation and mitigation strategies to manage for healthy, resilient ecosystems. When necessary, a climate change analysis will be included during project level environmental analysis.

3.2 Cultural Resources

Cultural resources are non-renewable resources that include historic and prehistoric artifacts, structures, sites, and districts important for their scientific, educational, economic, social and traditional values. The USFS is responsible for identifying, evaluating, and protecting cultural resources on the public lands they manage, including lands within Chimney Rock National Monument. Significant cultural resources include resources that are eligible for listing, or are already listed, on the National Register of Historic Places (NRHP) and Priority Heritage Assets. The San Juan National Forest has established an active cultural resource program that has focused on identifying, preserving, and interpreting cultural resources, as well as providing research opportunities for the most significant resources. Twenty-six Native American pueblos and tribes claim cultural affiliation or traditional association with the cultural resources located within Chimney Rock National Monument. The use of the area by tribal members for traditional cultural, ceremonial, and food and medicine gathering purposes is an important part of the tribes

connection to this area. In addition, throughout Southwestern Colorado there is great public interest in visitation to cultural resources and this visitation is an integral part of the region's economy.

The designation of the Chimney Rock Archaeological Area as a National Monument was in large part due to the recognition of the significance of archeological resources located there, the importance of those resources to many pueblos and tribes, the interest of the public to visit these sites, and the potential economic benefits heritage tourism could bring to the area.

Chimney Rock National Monument was created to highlight and protect the significant cultural resources in the Chimney Rock and Peterson Ridge areas, along with the other features such as the landscape setting, visual, and auditory environment. The creation of the Monument also recognizes and respects the traditional cultural values that the area has to many pueblos and tribes. Individual tribal members still use Monument lands to gather plants or other native materials, or for other traditional and ceremonial uses. Consultation efforts with the pueblos and tribes are on-going and are an important component of all management efforts within the Monument.

Affected Environment

Currently, 167 prehistoric archaeological sites have been identified within Chimney Rock National Monument. More archaeological sites may yet be identified as the entire Monument has not been inventoried for cultural resources. The majority of the archaeological sites identified so far range in age from Pueblo I (700-900 A.D.) to Pueblo II (900-1150 A.D.). Archaeological research shows that the area around the Chimney Rock cuesta was initially settled by the late 800s A.D., with the most intensive occupation occurring during the Chaco fluorescence in the Pueblo II period. The Chimney Rock communities were on the northeastern edge of the larger Chaco world that began to coalesce in the late 900s A.D.

The Chaco phenomenon was a complex system of dispersed communities bound by economic, political, and religious interdependence. Between 950 and 1150 AD, residents of the San Juan Basin of northwestern New Mexico and southwestern Colorado "*expended almost unbelievable human energy to create a cultural landscape of epic proportions, a truly enduring architectural masterpiece. They constructed massive buildings, great kivas, formal stairways up cliffs and mesas, a system of roads, and complex irrigation systems.*" (Judge and Malville, 2004). Some researchers believe that Chaco Canyon served as a ceremonial center linking as many as two hundred Chacoan settlements or "Outliers" dispersed throughout the San Juan Basin, including Chimney Rock. Other researchers have focused on the idea that Chimney Rock was a frontier trading center:

> *"The nature and extent of the influence of Chaco Canyon has been debated over the years, with arguments centered on the nature of Chacoan core/outlier interaction. Proponents of a regional paradigm tend to view the Chimney Rock great house as an outlier built as an expansion of Chaco into the resource rich northern frontier of the Anasazi world. In this model, resources were extracted from the Chimney Rock area, with the great house functioning as a center of trade. Whether this expansion was accomplished through egalitarian means or imperial subjugation remains a point of contention (Chuipka et al. 2010)."*

According to Eddy (1977), most of the sites within Chimney Rock National Monument were aggregated into seven site groups:

> *"These clusters of sites are thought to have been largely self-sufficient, organized communities. Three of these (Pyramid Mountain, Southern Piedra, and Northern Piedra Groups) are distributed in a north-south line paralleling the Piedra River while three others (High Mesa, East Slope, and Stollsteimer) occupied the high terrain along the east side of the mesa. The seventh group, Ravine, forms an east-west bridge which ties the two together."*

The High Mesa Site Group consists of 16 sites which includes the Chimney Rock Great House, the Guard House, and the Parking Lot Site. The East Slope Group consists of five residential sites and 7 non-architectural sites. The Stollsteimer Group consists of nine permanent residential sites and six other non-architectural sites that may have been camps or workshops. The Ravine Group consists of five architectural habitation sites and three non-architectural temporary camps. The Pyramid Mountain Group consists of two large sites, the Village Site and site 5AA130. The Southern Piedra Group consists of six architectural sites and one workshop. The Northern Piedra Group may have actually housed more people than the High Mesa Site Group with 14 sites that contained approximately 70 buildings.

An eighth group, the Peterson Ridge Group has been identified on the ridge of the same name to the west of the Piedra River (Chuipka et all, 2010). Twenty-five sites have been identified on the Peterson Ridge Group, 19 of which were habitations. One of these sites is potentially a Chacoan style great house that was located to align with the Chimney Rock pinnacles in order to make astronomical observations (Malville, 1993).

Most of the sites within the Monument can be classified as habitation sites which would include architectural sites with standing walls, rubble mound sites, "crater mound" sites, pithouses, field houses and jacal concentrations. Other prehistoric site types include open campsites, artifact concentrations, and isolated finds. Recent archaeological investigations have also identified potential water control features.

The Chimney Rock Great House, Great Kiva/Ravine Site and the Parking Lot Site are the only archaeological sites which have been intensively excavated and reconstructed for public interpretation. These sites, plus a few excavated and backfilled sites, have yielded the archaeological background for the Monument. The first scientific archaeological investigations at the Chimney Rock Great House were conducted by J. A. Jeancon, curator of archaeology and ethnography at the State Historical and Natural History Society in Denver. The 1921 investigations focused on portions of the Chimney Rock Great House, specifically the East Kiva, five of the larger rectangular rooms, and six of the smaller enclosures surrounding the kiva. The scope of Jeancon's excavations that year is remarkable, but would not be possible under the rigorous standards applied to archaeology today. After finishing work at the Great House, Jeancon's crew excavated the Guard House (5AA084), located on the trail to the Great House, and two rooms at 5AA085, on the mesa spine to the west. Later the crew moved to the lower benches bordering the Piedra River flood plain to excavate a site known as Pargin Ranch Tower, and several structures at Harlan Ranch.

Excavations at the Chimney Rock Great House resumed the following year, this time under the direction of Frank H. H. Roberts who had served as one of Jeancon's assistants the preceding year. The 1922 work again focused on the Great House and consisted of excavation of the West Kiva and five associated rooms (Jeancon and Roberts 1923).

The Great House was not backfilled and remained exposed to the elements during the 50 years between this early work and the next episode of scientific investigations at the site. In 1970, the Chimney Rock

Archaeological District was listed on the National Register of Historic Places. That same year the University of Colorado in Boulder was contracted to inventory sites within the area, conduct investigations at one site in the access road, excavate additional rooms at the Chimney Rock Great House, and ready the site for public visitation. The Chimney Rock Archaeological Project was supervised by Dr. Frank Eddy (Eddy 1977).

The 1980s ushered in the era of non-intrusive archaeological investigations, with Chimney Rock representing an important part of a region-wide attempt to define and explain what has been termed as the "Chacoan phenomenon". Several specialized studies were conducted on the ground and using materials derived from earlier excavations at the site. These studies include aerial photography as well as ground and air photo mapping and detailed analysis of the pottery assemblage. Scholars began to recognize the potential of the site to have served as an astronomical observatory and as a socio-political center during the late Pueblo II period (Lipe et al 1999; Malville 2004; Judge and Malville 2004).

In 1983, the San Juan National Forest Land and Resource Management Plan designated the Chimney Rock Archaeological Area as a special management area to be managed with an emphasis on cultural resources. "In light of the national significance of the Chacoan sites, and the urgent need to protect them," in 1980 the United States Congress created the "Chaco Culture Archaeological Protection Sites System," (Title V, PL96-550). In 1995, the United States Congress recognized the national significance of the Chimney Rock Archaeological Area by including it in the "Chacoan Outliers Protection Act." This Act made Chimney Rock Archaeological Area one of the Chaco Culture Archaeological Protection Sites.

The University of Colorado returned to the Chimney Rock Great House in 2009 to conduct limited archaeological excavation and fill reduction in advance of major stabilization work. This excavation was supervised by Dr. Stephen Lekson and PhD candidate Brenda Todd. Their work focused on rooms 5 and 7 of the Great House. Although this excavation was extremely limited, it was conducted with advanced archaeological techniques and greatly contributed to the understanding of Chimney Rock and its relationship to Chaco Culture. Lekson and Todd's excavation recovered the earliest date thus far from the Chimney Rock Great House dating it to as early as 1011 A.D. These excavations also demonstrated that construction of the Great House most likely directly involved members of the Chaco culture rather than being an "emulation" of Chacoan style by a local (non-Chacoan) people.

Stylistically, the Chimney Rock Great House is an excellent example of Chacoan architecture. According to Dr. Lekson, the Chimney Rock Great House is the "Ultimate Outlier" (Lekson, 2004). The Chimney Rock Great house is an L- shaped structure with a floor area of 2,535 square meters containing two kivas, at least thirty-five ground floor rooms, and perhaps a few more rooms on a second floor. The structure incorporates the hallmarks of classic Chacoan architecture including a large pre-planned geometrically formal design with multiple stories, large rooms, Chacoan style kivas built within the structure, and core and veneer masonry walls utilizing finely shaped and pecked stones with sharp corners. Like most Chacoan Great Houses, the Chimney Rock Great House is associated with a "village,"- a cluster of small houses and a Great Kiva (Kantner, 2006).

> *"In its unique design the Chimney Rock Great Kiva suggests a symbiosis of local tradition and Chacoan ideology. Unlike the Great House, it was built in the midst of the indigenous community of the high mesa suggesting that it, like other great kivas, may have been designed to foster community integration." (Malville, 2004).*

Numerous researchers have concluded that the key to understanding the Chimney Rock Great House – its high location far from water, arable land, and the "Chacoan" heartland – may be the strikingly prominent stone pinnacles: Chimney Rock and Companion Rock (Eddy, 1977; Lister, 1997; Malville, 2004). Eddy speculated that the two chimney pinnacles were worshipped as a shrine in prehistoric times (Eddy, 1977). Ethnographic accounts from the modern Pueblos support this hypothesis.

Since 1988, Malville and other researchers have hypothesized that the twin spires served another very unique and significant role in Chacoan culture – that of astronomical calendar. According to Malville the view of the full moon rising between the Chimney Rock pinnacles occurs every 18.6 years during the height of the Major Lunar Standstill. This event marks the culmination of the complex lunar cycle. Malville has also noted that the Chacoan style stone basin on site 5AA88 lines up with the north wall of the Chimney Rock Great House, which also lines up with the rising of the sun on the summer solstice. Presumably this calendrical information could have been relayed to Chaco Canyon via a line-of-site communication network, thus signaling the appropriate time for commencing ceremonies and festivities (Malville, 2004).

Environmental Consequences

National Monument designation potentially brings with it many important benefits to the Chimney Rock cultural resources such as national recognition, intensified management, greater protection, greater funding opportunities, greater recognition of tribal interests in the area, and highlighted research interest. Designation may also potentially bring with it many impacts – both direct and indirect. Direct impacts may result from natural events as well as human activities that can damage cultural resources or alter their settings. Indirect impacts to cultural resources are not always as obvious or immediate as direct impacts and may include impacts that occur off-site in project areas and heavily visited areas. Indirect impacts may include accelerated erosion due to increased traffic, construction, loss or changes of vegetation, and changes in drainage patterns, as well as inadvertent damage from increased visitation to sites not previously accessible and not "hardened" for public use (which may also result in increased vandalism and removal of artifacts). Projects may also result in piecemeal or incremental loss or degradation of the various elements of integrity such as setting, feeling, association, and location (which includes visual and auditory elements) that are integral to the cultural landscape and significance of Chimney Rock National Monument.

Federal laws and regulations, Forest Service manuals and policy, and the San Juan National Forest LRMP provide overall guidance for the management of cultural resources. In general, under all alternatives potential impacts to cultural resources would be avoided or mitigated by applying appropriate regulations, policy, standards, guidelines, and through law enforcement support and education, as appropriate. The LRMP also provides specific guidance and suitability for Chimney Rock National Monument. Potential impacts to cultural resources within the Monument will also be avoided or mitigated through additional specific standards and guidelines provided in the Chimney Rock National Monument Management Plan under Alternatives B and C. In spite of archaeological inventories, the potential exists for buried, undiscovered sites to be exposed and/or damaged by ground disturbance and/or other events. These sites may, or may not, be noticed in time to allow for mitigation. This damage would represent an unavoidable adverse impact related to management activities and programs

Under all alternatives, consultation efforts with the pueblos and tribes affiliated with the SJNF will be ongoing, and access to the Monument by tribal members for traditional cultural, ceremonial use and food and medicine gathering will continue. Access to the Monument for research will also continue with Forest Service authorization.

Alternative A (No Action)

Under Alternative A, effects to cultural resources from activities on NFS lands such as fuels treatments, recreation, oil and gas development, and livestock grazing are expected to be similar to those described in the EIS for the LRMP. Alternative A provides for the least amount of recreational facilities, and would result in no new ground disturbance for recreational facilities. Since Alternative A would provide for no new ground disturbance from recreational facility development, it would therefore have the least amount of potential direct impacts to cultural resources that were not discovered during archaeological surveys conducted in compliance with the NHPA. However, if the projected increase in visitation due to Monument designation does occur, there may be an increase in direct and indirect effects to cultural resources due to the lack of adequate facilities for parking and user created trails. Parking outside of designated areas and the creation of user created trails could potentially impact cultural resources through ground disturbance, loss of vegetation, erosion and vandalism.

Livestock grazing can also result in impacts to cultural resources, especially where animals congregate to drink water or consume minerals, where they shelter under rock overhangs, and/or where they use pathways and stock trails. The stratigraphic soil layers that are very important in establishing cultural chronologies may be churned and distorted by livestock trampling, movements, and congregation. Areas where livestock concentrate are often located near springs, rock shelters, cliff faces, drainages, and forest edges—the same areas that are important to humans prehistorically and historically. Cattle may also damage standing prehistoric and historic structures and rock art through rubbing and trampling. The portion of the Monument open to livestock grazing is on Peterson Ridge, which was included within the boundaries of the Monument due to the very significant cultural resources located there. Alternative A would allow grazing to continue on Peterson Ridge as currently permitted, using an adaptive management system which relies on monitoring to determine if management changes are needed, and if so, what changes, and to what degree. Under Alternative A, cultural resources would be monitored for impacts from grazing. If unacceptable impacts are identified, then management actions will be taken to eliminate or mitigate such impacts.

The potential for impacts to cultural resources under Alternative A is also greater than under Alternatives B and C, because the specific standards and guidelines developed to protect cultural resources, viewsheds, night skies, and the auditory environment under the Chimney Rock Management Plan would not apply to Alternative A. Therefore both Alternatives B and C would provide additional protections for cultural resources.

Alternative B

Alternative B offers the strongest protection to the archeological, landscape, and biological objects of the Monument by focusing on the protection of the cultural and natural environment. While the proposed building envelopes are the same for Alternatives B and C, Alternative B would disturb a smaller area (approximately 1½ acres) as compared to Alternative C (approximately 2 acres). Therefore, there is a smaller area where cultural resources that were not discovered during archaeological surveys conducted in compliance with the NHPA could be potentially impacted under Alternative B as compared to

Alternative C. The standard that all new ground-disturbing activity within 300 feet of an eligible or unevaluated site must be reviewed and/or monitored by a qualified Archaeologist would be applied to both Alternative B and C. This standard would provide additional protection to cultural resources under those alternatives and would lessen the possibility of potential impacts to undiscovered cultural resources. The construction of these facilities may also help prevent direct and indirect impacts to cultural resources from parking in undeveloped areas and from user created trails. Closure of the Monument to dispersed camping would also greatly reduce the potential for direct and indirect impacts to cultural resources by protecting them from potential ground disturbance, loss of vegetation, erosion and vandalism that could be associated with dispersed camping activities. Camping associated with administrative use or as needed for other authorized purposes such as research could be allowed on a case-by-case basis.

Alternative B would increase the maximum operating season by approximately 1½ months. This could have both positive and negative impacts to cultural resources. Positive benefits could result from an extended operating season by providing a management presence on-site to direct and monitor site visitation thus helping to prevent vandalism and other potentially damaging activities that may occur from visitor use during the "off-season." However, increased tours and visitation that may result from an extended operating season may also result in more "wear and tear" on the cultural resources.

Overall impacts to cultural resources from recreation under Alternative B would mainly be positive; however there is some potential for negative effects. The potential for negative impacts from recreation is less under Alternative B than under Alternatives A and C. In addition, the potential for impacts to cultural resources under Alternative B is less than under Alternative A because the specific standards and guidelines developed to protect cultural resources, viewsheds, night skies, and the auditory environment under the Chimney Rock Management Plan would apply.

Closure of the portion of the Turkey Allotment on Peterson Ridge to livestock grazing would ensure that the cultural resources located there would be protected from grazing impacts, and would eliminate the need to monitor livestock impacts on cultural resources. Therefore Alternative B would have less potential impacts to cultural resources from grazing than Alternatives A or C.

Alternative C

Alternative C, which provides for increased visitor and interpretive services and more developed access within a larger area of the Monument, may have more direct and indirect impacts to cultural resources from recreation than Alternative B. As discussed above, the potential for impacts to cultural resources from the construction of visitor facilities would be avoided or mitigated through compliance with the NHPA. However, the larger the ground disturbance the greater the potential would be for inadvertently impacting previously undiscovered cultural resources. Facility and parking lot development could occur on up to 2 acres under Alternative C, as compared to only 1½ acres under Alternative B. In addition, developing visitor and interpretive services on Peterson Ridge could potentially open this currently remote and difficult to access area up to impacts from visitation. Visitor impacts could include direct impacts such as vandalism, loss of artifacts, and damage to prehistoric structures, and indirect impacts resulting from increased erosion due to loss of soils and vegetation. Since the footprint of visitor facilities would be larger under Alternative C than Alternatives A or B, and since Alternative C would also increase visitation to Peterson Ridge (an area that currently experiences very little visitation), Alternative C has the most potential to impact cultural resources from recreation and the development of visitor

facilities. Additionally, Alternative C would not close the Monument to dispersed camping, so cultural resources would continue to be at risk from the impacts associated with that use. However, the potential for impacts to cultural resources under Alternative C are still less than under Alternative A because the specific standards and guidelines developed to protect cultural resources, viewsheds, night skies, and the auditory environment under the Chimney Rock Management Plan would apply.

Alternative C would increase the maximum operating season by three and a half months. This could have both positive and negative impacts to cultural resources. Positive benefits could result from an extended operating season by providing a management presence on-site to direct and monitor site visitation thus helping to prevent vandalism and other potentially damaging activities that may occur from visitor use during the "off-season." However, increased tours and visitation that may result from an extended operating season may also result in more "wear and tear" on the cultural resources.

Under Alternative C, grazing would continue in the Peterson Ridge area using an adaptive management system so impacts from grazing would be similar to those discussed under Alternative A. As in Alternative A, cultural resources would be monitored for negative impacts from grazing. If such impacts were identified then management actions would be taken to eliminate or mitigate such impacts. However, under Alternative C, the Chimney Rock Management Plan provides an increased emphasis on monitoring, as well as specific direction regarding the prohibition of livestock trailing through areas containing archeological resources. In addition, it provides direction requiring grazing management practices to utilize measures to avoid or minimize impacts to archaeological sites, and locating and constructing range improvements in a manner that does not harm or interfere with the objects of the Monument. Therefore, Alternative C would potentially have fewer impacts to cultural resources than Alternative A, but could potentially have more impacts to cultural resources than Alternative B which would close the Peterson Ridge area to grazing.

Cumulative Impacts

Over time, cumulative impacts to cultural resources may result in the loss of sites, or parts thereof, and the loss or diminishment of site integrity. The incremental loss of the cultural resource base can result in the loss of interpretive, scientific, and social/traditional values. Past actions that have contributed cumulatively to impacts on cultural resources include livestock grazing, vegetation management, mineral development, recreation, construction of visitor facilities, archaeological excavations, archaeological site stabilization, looting and vandalism, and ongoing natural erosion. These negative factors are present outside as well as inside the Monument.

Prior to Section 106 of the National Historic Preservation Act, many activities occurred on public lands with no regard for the protection of cultural resources. Vegetation treatment activities such as chaining, which involved dragging large chains or harrows across the ground surface to remove trees and shrubs, along with other mechanical treatments, undoubtedly destroyed numerous archaeological sites within their path. The development of many mines, roads, railroads, timber sales, and campgrounds within southwestern Colorado took place prior to Section 106 protection requirements, and untold numbers of archaeological sites were likely destroyed or disrupted. Thousands of cattle and sheep grazed the public lands with little or no limitations or regulation from the 1870's up to the1940's, causing resource damage and erosion, which resulted in major impacts and loss of cultural resources.

Loss of cultural resources on private lands has been extensive in the past and is ongoing. "Arrowhead hunting" and "pot hunting" have a long been a favorite recreational and commercial pastime in southwest Colorado. The selling of "Anasazi" pots and artifacts has been a lucrative source of income for over 120 years. Although the Antiquities Act, Archaeological Resource Protection Act, and Native American Graves Protection and Repatriation Act (NAGPRA) prohibit this on public lands, looting still continues on public lands and is ongoing on private lands, which is only regulated by Colorado State law that prohibits the disturbance of human remains. There has also been a tremendous loss of cultural resources on private lands due to the development of farming, oil and gas, towns, and residences in southwest Colorado and northern New Mexico. Past developments on private and public lands have resulted in major cumulative impacts to cultural resources.

As a Chacoan Outlier, the Chimney Rock Great House belongs to a unique class of Ancestral Puebloan sites. After years of extensive research, two hundred and fifty-two Chacoan Great Houses have been documented in Arizona, Colorado, New Mexico and Utah. Thirty-nine of these Outliers, including Chimney Rock have been protected under the Chacoan Outliers Protection Act. Past oil and gas development on public lands has impacted many of these rare resources. Currently there is a renewed push for even more oil and gas development in areas of northern New Mexico which could potentially create additional impacts or loss of these unique sites. This makes preservation of sites within Chimney Rock National Monument all the more critical. In addition to oil and gas development, current and future land management projects in the Four Corners Region may result in additional surface disturbance and may bring additional people in contact with cultural resources, which could also lead to additional impacts to those fragile resources.

Current and future development and uses specific to the Monument could include increased visitation, construction of facilities and trails, livestock grazing, fuels treatments, and the development of valid existing mineral rights. Under the different alternatives, differences in cumulative impacts to cultural resources would mainly be the result of sanctioned management activities. It is anticipated that overall these impacts would be minor due to the protection and mitigation measures that would be implemented. Alternative C would have the highest projected amounts of development and, therefore, would have the highest potential to impact cultural resources and therefore the highest potential for cumulative effects. Alternatives A and B would provide for less development and therefore have less potential for cumulative effects to cultural resources. However, as stated above, Alternative A may have more potential to impact cultural resources than Alternative B, and would therefore potentially contribute to more cumulative effects than Alternative B.

Current and future impacts may also occur to cultural resources on public lands as a result of non-sanctioned activities (including vandalism, looting, or illegal excavation). Efforts to control and monitor these activities would be similar under Alternatives B and C and therefore may result in a similar minor to moderate level of cumulative adverse impacts to cultural resources under these alternatives. Alternative A may result in more cumulative effects to cultural resources from non-sanctioned activities as it would not provide for development and implementation of a monitoring plan. Cumulatively, cultural resources on federal lands may assume greater importance because such resources on private lands are not provided the same degree of protection. Projects in and around the Monument funded by the federal government are subject to federal requirements for protection of cultural resources. Construction and development on private land may destroy cultural sites without providing an opportunity for recovery of data or other mitigation. Therefore, it is believed that cumulative impacts to cultural resources on private lands are much greater than on federally

administered lands. In essence, federal lands have become the major "repository" of cultural resources in the region, making the preservation and protection of these resources even more important.

3.3 Recreation and Facilities

The archaeological sites and dramatic landscape of Chimney Rock have attracted tourists since at least the early 1920s. Historic photos and newspaper articles from this time document primitive improvements, including an access road, trails, and signage. Recreational visitation to the Chimney Rock area has continued to increase over the years, as have amenities designed to accommodate increased visitation and improve visitor experiences.

Affected Environment

With the exception of the Peterson Mesa area, the Monument has a Summer Recreation Opportunity Spectrum (ROS) classification of Roaded Natural; the Peterson Mesa area is classified as Semi-Primitive Non-Motorized. The Winter ROS for the entire Monument is semi-primitive, non-motorized. The ROS is a planning system utilized by land managers to classify areas according to the types of recreation opportunities available therein. Roaded Natural areas are characterized by a predominantly natural-appearing environment as viewed from sensitive roads and trails, with moderate evidence of the sights and sounds of people. Contact between visitors is low to moderate on trails and moderate to high on roads. Conventional motorized uses are provided for in the design of facilities, and moderate site modification is common for facilities. Semi-Primitive Non-Motorized areas have a natural-appearing environment, and there is a high probability of experiencing solitude, closeness to nature, self-reliance, challenge, and risk. Interactions between users are occasional, and motorized travel is not permitted. Access is via non-motorized trails, non-motorized primitive roads, or cross-country

A graveled roadway, two paved parking lots, a barrier-free interpretive trail, a native-surface trail, interpretive, regulatory, and informative signage, two composting toilet facilities, and several benches and picnic tables in the main Chimney Rock area constitute the majority of the improvements at the Monument. There are no developed facilities in the Peterson Ridge area. A 288 sq. ft. cabin owned by the Chimney Rock Interpretive Association (authorized through a Special Use Permit from the Pagosa Ranger District) is located adjacent to the lower parking area and serves as a visitor center, though it can only accommodate a few people at one time. The lower parking lot consists of 24 parking spaces, while the upper lot has 26 spaces. A 2.5 mile stretch of gravel road connects the two lots. The majority of the developed archaeological sites, the 0.29 mile barrier-free Great Kiva Trail, and the 0.31 mile Great House Trail are located on the upper mesa in the vicinity of the upper parking lot. Drinking water is not available at Chimney Rock. The majority of the upper mesa area is highly exposed, with little shade and no structures to provide relief from the sun or shelter during storms.

The current visitor capacity of the developed area of Chimney Rock, as measured by Persons At One Time (PAOT), is estimated to be 150 PAOTs. PAOT capacity measurements are based on a variety of factors including available parking, restroom facilities, and the typical number of occupants per vehicle. This includes both the lower and upper areas of development; the capacity of the upper mesa development itself is estimated to be 70 PAOTs. This limited capacity is due to geographic constraints (e.g., the Great

House site is accessible only via a narrow ridge line trail) and the presence of numerous archaeological sites that limit the size and location of the parking lot in the upper mesa area.

Since at least the 1970's, guided tours have been required to access the upper parking area by motor vehicle. These tours were conducted by the Forest Service in the past, and more recently by partnering non-profit organizations. Presently, they are provided to the public for a fee by the Chimney Rock Interpretive Association (CRIA) between May 15 and September 30. In addition to the standard daily tours provided by CRIA, several special events are held throughout the operating season, including programs relating to archaeoastronomy, full moon, night sky, pottery, and Native American cultural gatherings. Given the size limitations of the upper lot, oversized vehicles and trailers have historically been prohibited from travelling to the upper parking area. The limited available parking, while mostly manageable for the routine tours established by CRIA, has presented a variety of challenges during larger special events and summer holidays. Experiments utilizing passenger vans in recent years for the events have been explored.

The number of annual visitors to Chimney Rock, as determined by participation in tours and special programs, has increased from 738 in 1980, to 4,700 in 1991, to over 8,000 in 2012, prior to designation as a national monument. After designation in 2013, visitation increased 5% to 8,600. These figures do not include visits by people accessing the site during non-tour hours or the off-season.

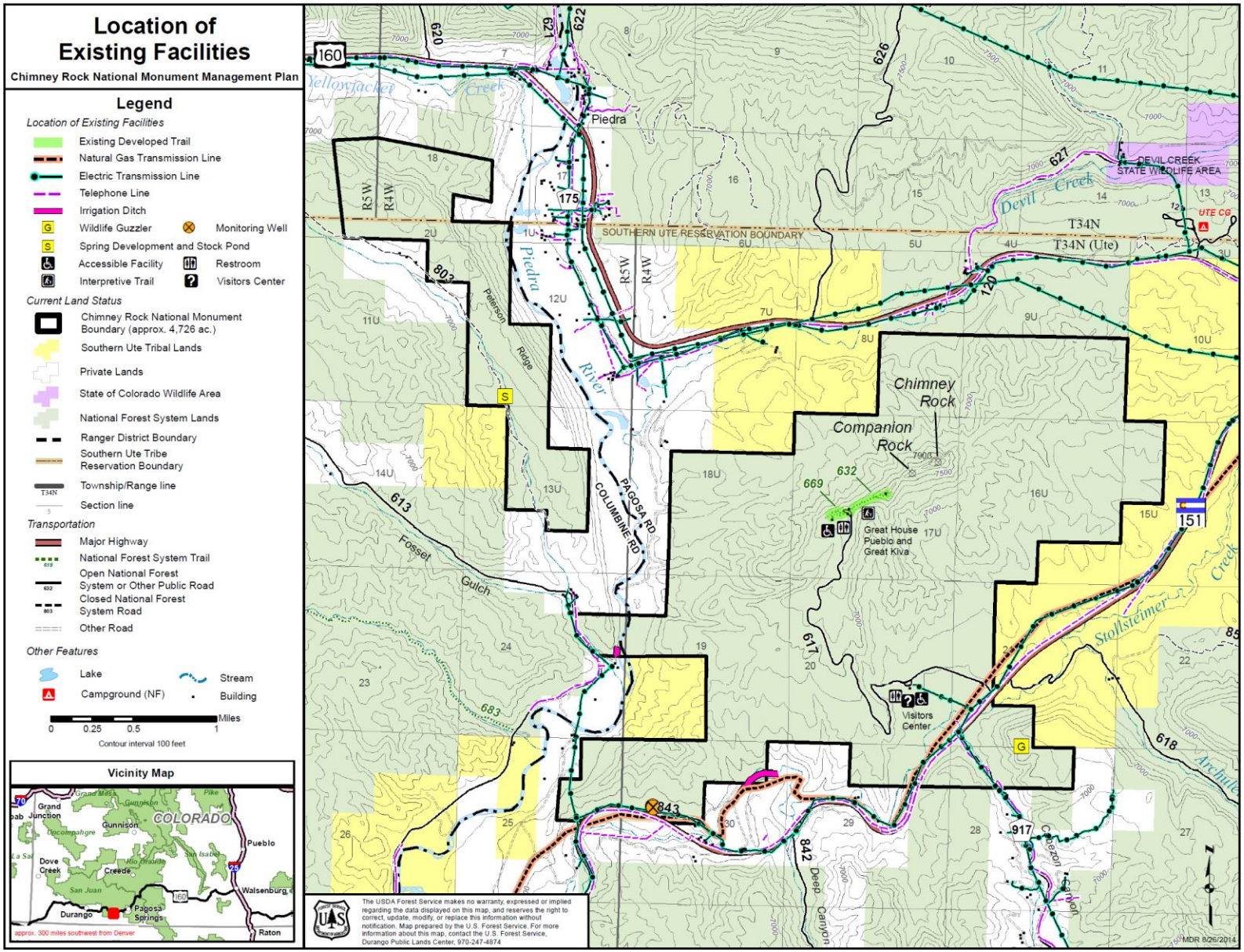
CRIA, in addition to administering the interpretive programs and tours at Chimney Rock, has been responsible for the day-to-day operations of the site under the authority of a Granger-Thye permit issued by the Pagosa Ranger District. Operational duties include site cleaning, trash removal, minor facility maintenance, toilet operation and maintenance, signage, and general visitor information. Fees associated with the permit are offset under the Granger-Thye authority by the provision of additional, non-maintenance related work and services by CRIA in agreement with the Forest Service. Typical offset projects include infrastructure repairs, facility improvements, and archeological site stabilization.

In addition to the guided and self-guided tours, a wide variety of dispersed recreation activities occur throughout the year at Chimney Rock. During the off-season (Oct. 1 – May 14), the site is visited by hikers, horseback riders, skiers, and bicyclists who park in a small graveled area at the gated entrance along Highway 151 and either follow the main road to the upper mesa area or travel cross-country. Such use also occurs, though less frequently, during the open season after hours when the main gate is closed. Big game and small game hunters also use the site, especially during late fall. Visitor counts are not available for these types of activities, though use is comparable to other areas on the District that receive relatively low levels of visitation (less than 10 visitors per day on average). Exceptions to this are during late fall when big game hunting is popular in the Chimney Rock area, and early spring when snow still covers much of the rest of the forest but has melted at Chimney Rock. The Peterson Ridge area receives very low visitation, with most use occurring during fall big game hunting seasons.

Environmental Consequences

Guidance for the management of recreation resources is set forth in the 2013 San Juan LRMP; the Chimney Rock Management Plan augments the LRMP guidance with desired conditions, objectives, and standards and guidelines specific to Chimney Rock National Monument. The effects of this plan, as well as alternative proposals for recreational improvements and restrictions on management activities in the Monument are discussed below.

Figure 7: Location of Existing Facilities



Alternative A (No Action)

Alternative A represents the continuation of management direction found in the 2013 LRMP and the proclamation. As such, there would be no substantive changes to the current management of recreation resources under this alternative. Recreation opportunities and experiences would remain consistent with their present characteristics for the near future. Improvements to recreation facilities and the creation of additional recreation opportunities would not be undertaken in this alternative; guided tours to the upper mesa would continue to be the primary recreation opportunity available at the Monument.

As noted above, annual visitation to Chimney Rock has increased slowly during the past few decades, with a 5% increase occurring the year following its designation as a national monument. While predictions for future visitation levels are difficult, it is safe to assume that given past trends and the increased awareness of Chimney Rock following its designation as a national monument, visitation will continue to increase in subsequent years. The initial increase in visitation experienced during the 2013 season of 5% can be expected to recur over the next several years—as has been the case in other areas receiving Monument designation (BBC Research and Consulting, 2012)—followed by more gradual increases that reflect general usage patterns of public lands and special places in the region. It should be emphasized, however, that external factors such as changing economic and environmental conditions (e.g., increased fuel costs or the presence of large-scale wildfires in the area) can dramatically alter visitation levels in any given year.

As discussed in the affected environment section, visitation during special events and over summer holidays has presented a variety of management challenges given the limited parking and infrastructure development available at Chimney Rock. With visitation levels likely to increase, it can be reasonably anticipated that under this alternative these challenges and their associated impacts will gradually increase in frequency and extent, as no improvements to visitor facilities will be undertaken in this alternative. Increased perceptions of crowding, impacts to vegetation and cultural resources, safety concerns, strain on wastewater facilities, and more time spent by managers mitigating these issues are all likely to some extent under this alternative. Additionally, without improvement to parking, visitors traveling in tour buses and oversized recreational vehicles would continue to encounter difficulties accessing the Monument.

Alternative A maintains the existing operating season (established by CRIA) of May 15 through September 30, although the site is typically accessible and snow-free from March through early November. This is a popular time of year to visit lower elevation sites in the San Juan mountains (such as Chimney Rock), but the current operating season precludes opportunities for shoulder season visitation as part of a guided tour. Dispersed use or walking into the site from the highway gate could still occur. An increase in dispersed recreation use can also be expected as a result of the Monument designation, especially bicycling, hiking, and horseback riding. The existing parking area at the entrance gate along Highway 151 can accommodate roughly 4 standard vehicles. Consequently, it is likely that parking area crowding and/or spillover onto Highway 151 will result in the future if this alternative is implemented.

Alternative B

Under this alternative, a variety of recreation-related improvements could be implemented, including construction of a 3,000 square foot visitor facility, improved water/wastewater systems, visitor shelters, additional parking areas, and new interpretive trails. The annual operating season could be extended to May 1 through October 31, and the Monument would be closed to dispersed camping. Several additional

prohibitions relating to visitor use, such as a seasonal area closure around the spires to minimize disturbance to peregrine falcons during breeding season, a closure to over-snow vehicle use, and a closure to public entry around the immediate vicinity of the spires to prevent rock climbing, would also be approved in this alternative (See Section 2.3 for a list of prohibitions).

The proposed improvements to recreational facilities under this alternative would help to alleviate many of the concerns noted above relating to potential future overcrowding, inadequate parking, strain on existing wastewater facilities, resource impacts, and limited visitor opportunities. While visitation to the upper mesa area would continue to present challenges for managers given the area's geographic and archeological constraints, the new amenities in the lower area would provide additional recreation opportunities for visitors and disperse use over a larger area. The potential construction of new trails in the future would further disperse use by offering additional and different types of recreation opportunities.

Expanded parking in the lower area would alleviate the need to park vehicles off of designated areas, provide opportunities for people traveling in oversized vehicles to visit the Monument, facilitate the implementation of a shuttle system, and improve safety conditions with respect to vehicular and pedestrian traffic. If implemented, parking capacity in the lower area would increase from the current 24 spaces for standard-sized vehicles to 54 standard vehicles, 10 oversized vehicles, 1 tour bus, and 3 shuttles; the parking area at the entrance gate would be expanded to accommodate up to 5 standard vehicles. This capacity level would address most general visitation scenarios for the foreseeable future, with the possible exception of large events. The limited parking available at the upper mesa will still necessitate some form of controlled access; however, this alternative improves upon the current condition by creating parking in the lower area for more vehicles and shuttles which, coupled with the increased visitor attractions in the lower area such as a new interpretive trail and visitor facility, will relieve pressure on the upper lot.

The proposed area closures and other restrictions associated with this alternative would have little effect on recreation use and experiences in the Monument. This is due to the fact that either the prohibitions have already been in place for many years and as such will not constitute substantive changes (e.g., the snowmobile and peregrine falcon area closures), or they are preemptive in nature and do not restrict or eliminate an activity that is presently engaged in by many visitors (e.g., the rock climbing closure, special use permit restrictions, and dispersed camping prohibition). In general, Alternative B improves upon the current condition (Alternative A) with respect to recreation resources by providing management direction designed to enhance visitor experiences and reduce existing operational challenges. Alternative B also would likely result in greater visitation levels as compared to Alternative A given the longer operating season and increased parking capacity (especially for oversized vehicles and tour buses).

Alternative C

The effects of this Alternative on recreation resources would be similar to those discussed for Alternative B, with the exception that an even greater emphasis would be placed on recreation and tourism by expanding visitor opportunities, services, and amenities over a larger area within the Monument. If implemented, this alternative would authorize construction of a visitor facility of up to 4,500 square feet and up to 2 miles of interpretive trail. Parking could be increased from the current 24 spaces to spaces for 74 standard vehicles, 20 oversized vehicles, and three tour buses in the lower area; at the entrance, an expanded parking area could accommodate 8 standard vehicles. This capacity level would meet general visitation needs for the foreseeable future and accommodate most large events. The operating season could

be extended under this alternative to April 1 through November 30. This extension, coupled with the increased parking (especially for oversized vehicles and tour buses) would, over time, likely result in a greater increase in visitation as compared to Alternative B. New interpretive and visitor services would be authorized in more areas throughout the Monument as compared to Alternative B, including the Peterson Ridge area. The effects of prohibitions and restrictions on use would be the same as Alternative B.

Cumulative Impacts

The Chimney Rock area has provided recreational opportunities since the early 1900's. Over time, the recreation experience at the site has changed, mainly due to changes in access and facilities, excavations of several dwellings for public viewing, and public tours. Decisions made in this planning effort may impact the recreation experience of visitors by making changes to visitor facilities, parking areas, trails, the operating season, and implementation of prohibitions for resource protection. Foreseeable future activities may include continued increases in visitation levels resulting from designation as a national monument, the potential for Chimney Rock to be included as a destination along a newly proposed state scenic byway, and general increases in visitation to the Four Corners area. There may also be additional changes to facilities within the Monument, construction of additional trails, additional interpretive programs and special use permits, and continued development of private lands near the Monument. Direction provided by the LRMP, the proclamation, and the Chimney Rock Management Plan will allow for further development of visitor and interpretive services at the Monument while still protecting other objects of the Monument, and will guide the implementation and planning of all future projects. The implementation of this action combined with past, present, or foreseeable future activities in or around the Monument, would result in minor cumulative effects to the recreation resource.

3.4 Travel Management

Affected Environment

Currently within the Monument, there are several roads of various designations. This includes four National Forest System Roads (NFSR), one State Highway (SH), one County Road (CR), and two private roads/ driveways. The paved parking lots at the visitor center and on the upper mesa are also considered system roads. The Forest Service is responsible for the maintenance of NFS Roads. Maintenance of non-NFS roads is the responsibility of the permit holder. Table 2 below displays relevant information related to these roads.

Primary highway access to the Chimney Rock National Monument is provided by SH 151 on the south side of the Monument. Approximately 0.73 miles of this highway occurs within Monument boundaries and is operated and maintained by the State of Colorado under a Highway Easement Deed. The main access road within the Monument that accesses the visitor cabin, the ridgeline trails, and interpretive area is the Chimney Rock Road (NFSR 617). The Chimney Rock Road is approximately 3 miles long, starting at the intersection with SH 151 and terminating at the parking lot on the upper mesa. The first 0.75 miles of the road from the intersection with SH 151 to the visitor cabin is open to all licensed vehicles when the Monument is open for tours. Vehicle access along the 2.25 mile stretch of road from the visitor cabin to the parking lot on the upper mesa is currently allowed only on guided tours during the operating season. The road is gravel surface with grades reaching up to 6 percent. It is maintained 1 to 2 times per season, or as funding allows, but over

the course of the operating season specific areas begin raveling and wash boarding. These conditions can make driving the road uncomfortable for some visitors. As raveling and washboarding increase, skidding distances increase and the driving surface continues to deteriorate. In some areas, the base course and sub base are visible within the traveled roadway; in these locations the surface course has completely degraded. Maintaining the road two times per season keeps it in its current condition, but further deterioration of the road over time will likely require more intensive improvement efforts in the future.

Table 2: Current Transportation System within the Monument

System Roads within the Monument	Total Miles	Miles within the Monument	Status	Surface Type
NFSR 617 - Chimney Rock	2.99	2.99	Open - seasonal	Gravel
NFSR 617.A – Parking lot at Visitor Center	0.09	0.09	Open - seasonal	Asphalt
NFSR 617 - Parking lot on Upper Mesa	0.16	0.16	Open - seasonal	Asphalt
NFSR 843 - Cemetery	0.32	0.31	Open - seasonal	Native
NFSR 803 – Peterson Gulch	4.12	1.57	Closed	Native
State and County roads within the Monument	**Miles**	**Miles in Monument**	**Status**	**Surface Type**
State Highway (SH) 151	33.95	0.73	Open - year round	Asphalt
County Road (CR) 917	1.314	0.42	Open - year round	Gravel
Private roads within the Monument	**Miles**	**Miles in Monument**	**Status**	**Surface Type**
Cemetery Coal Mine	0.33	0.01	Closed - private only	Native
Fossett	0.18	0.06	Closed - private only	Gravel

The lower parking lot (NFSR 617.A) is located adjacent to the current visitor center, approximately 0.75 miles from the intersection with SH 151. The upper parking lot (NFSR 617) is located on the upper mesa, approximately 3 miles from the intersection with SH 151. Both parking lots were reconstructed in 1997 and improved in 2009. The lower parking lot typically accommodates 24 vehicles with space for one oversized vehicle. The upper parking lot typically accommodates 26 vehicles with no space for oversized vehicles. Only one bus or RV can utilize the available space in the lower parking area at one time. These types of vehicles are not allowed past the current visitor center because there is no space in the upper parking lot to turn such a vehicle.

The two remaining system roads are the Cemetery Road (NFSR 843) and the Peterson Gulch Road (NFSR 803). The Cemetery Road is a native surface road opened seasonally, depending on the physical conditions of the road. Approximately 1.57 miles of the Peterson Gulch Road is located in the Peterson Ridge portion of the Monument. This road is closed to motorized use.

County Road 917 is used to access private land south of the Monument. This road is operated and maintained by Archuleta County under a Public Road Easement. There are also two short sections of private roads that cross the Monument boundary that are needed to access private land adjacent to the Monument. These roads are closed to public motorized use, but the private landowners are allowed to use them to access their property. There are also several old road beds within the Monument boundaries that are no longer in

use, including an old alignment of SH 151 and old two tracks once used to access adjacent private land. These old road beds are revegetating naturally and there are no plans to use them in the future.

Environmental Consequences

Guidance for travel management is set forth in the LRMP. The proclamation also provides direction for travel management in the Monument. Specifically, the proclamation requires that all motorized and mechanized vehicle use be limited to designated roads, except for emergency or authorized administrative purposes, for the purpose of protecting the objects identified in the proclamation. In addition, the proclamation requires that a transportation plan be completed for the Monument that addresses actions necessary to protect the objects identified in the proclamation, including road closures and travel restrictions. Under Alternative A, this would be a stand-alone document prepared at a later date. Under Alternatives B and C, the Chimney Rock Management Plan itself will serve as the transportation plan by providing plan components designed to protect the objects of the Monument, including the adoption of a standard that would limit all motorized and mechanized vehicle use to designated roads, except for emergency or authorized administrative purposes. The effects of alternative proposals for management of the Chimney Rock National Monument on the transportation system are discussed below.

Alternative A

No new roads or parking areas would be added under Alternative A. Under Alternative A, the condition of the main NFSR 617 is expected to be similar to the current condition described under the affected environment section. Use of the road may increase as annual visitation increases in the coming years, but even with this increased use, it is likely that the current schedule of maintaining the road one or two times per year will be adequate to maintain the road in its current condition. However, if the condition of the road begins to deteriorate more rapidly or begins to negatively impact any objects of the Monument, it will likely require more intensive improvement efforts in the future.

The condition and use of the State and County Roads within the Monument are not expected to change under Alternative A. In addition, assuming there is no further use along the old road beds, they will continue to revegetate, thus preventing negative impacts to any objects of the Monument from erosion.

Existing private roads may be authorized where appropriate. This may include authorizing private roads outside of existing road corridors if they meet the criteria of being an appropriate use of NFS lands. Any new authorization of private roads may include a site specific environmental analysis. The issuance of private road authorizations would be subject to direction found in the LRMP and proclamation. In order to meet the intent of the proclamation to protect the objects of the Monument, specific requirements would have to be included in the operations and maintenance (O&M) plan to ensure that the objects of the Monument are protected.

Alternatives B & C

Under Alternatives B and C, short segments of road may need to be realigned or newly constructed to provide access to new visitor facilities in building envelopes 1 and 2. In addition, new parking areas may be constructed in building envelopes 1, 2, and 4. Once all necessary clearances are completed, final locations of these improvements will be chosen and the appropriate level of environmental analysis will be completed. The Forest Service would be responsible for the maintenance of any new or realigned

system roads. In addition, improved facilities and a longer season of use will likely increase the number of visitors using the main Chimney Rock road over the course of the operating season. This additional use may cause road conditions to deteriorate more rapidly, creating a need to maintain the road more frequently; intensive improvement efforts may be needed sooner than under current conditions.

The condition and use of the State and County Roads within the Monument are not expected to change under Alternative B or C. In addition, assuming there is no further use along the old road beds, they will continue to revegetate, thus preventing negative impacts to any objects of the Monument from erosion.

Existing private roads may be authorized where appropriate. Under Alternatives B and C, a standard included in the Chimney Rock Management Plan would prohibit new authorizations such as private roads unless it was along an existing road or utility corridor. Any new authorization of private roads may include a site specific environmental analysis. Specific requirements would be included in the O&M plan to ensure that the objects of the Monument are protected.

Cumulative Impacts

There are no past, present, or foreseeable future activities, when combined with the current action, which would result in a significant cumulative effect to the transportation system within the Monument.

3.5 Social and Economic Environment

The social and economic implications of the management of Chimney Rock National Monument are of interest to local residents surrounding the Monument, users of the Monument, and to people throughout the country who value or are interested in national monument resources. Historically, individuals in local communities developed strong place attachments to national monuments that provided recreational, aesthetic, employment, and other contributions to their social environment. Local communities have developed particular social and economic interests and concerns in the Monument and the interactions with their ways of life and their economic present and future. National publics also have interests and concerns about the Monument. These interests are expressed in direct experiences recreating, visiting, or otherwise using the Monument. Some of these publics also express their interest and concerns through national organizations with broad-based concerns about the management of the Monument.

Policy decisions that influence the management of the Monument attempt to balance the variety of uses and values individuals hold for the area. It is unlikely that any alternative selected in this process will answer the needs of all those interested in the Monument. Each alternative will be a compromise between providing for the uses and values of the Monument while still protecting the objects of the Monument.

This analysis describes the potential social and economic impacts to different interests and values of the Monument by alternative. The analysis includes a description of the study area, demographics and trends in Colorado and the study area, environmental justice considerations, and potential social and economic impacts by alternative on various Monument interests and values and resource interest groups within the study area.

Affected Environment

The relationship between the SJNF and the local economy and lifestyle in the surrounding region is integrated and complex. Outdoor recreation, tourism, livestock grazing, oil/gas/mining, and wood

products are all important aspects of the SJNF to the surrounding region. This analysis examines the present and future economic and social conditions of Archuleta and La Plata Counties, which are the two counties likely to be most affected by the activities and management of the Monument. The study area counties both influence and are influenced by the Monument, socially and economically. Estimates for potential economic or social impacts are considered in this analysis for the study area counties.

The Monument is located within Archuleta County (Figure 1), but the study area includes La Plata County as well due to proximity of communities and existing tourism industry connections. The SJNF is a large portion of both counties, making up 37 percent of La Plata County, and 46 percent of Archuleta County. The Monument is a small portion (approximately 4,726 acres) of the public lands in Archuleta County. This economic analysis considers the Forest as a whole and the counties surrounding it to be the impact area. Smaller areas are not broken out, as it is difficult to assign outputs or outcomes from one part of the San Juan to a specific community or location.

The Data Quality Act requires that federal agencies ensure the "quality, objectivity, utility, and integrity" of information disseminated to the public. Because of these requirements, the Forest Service focuses on the use of National Visitor Use Monitoring (NVUM) survey for all recreation and tourism related information used for use and economic analysis because the methodology and results can be documented and repeated as needed.

The following analysis highlights the conditions and trends found in the study area that will influence and be influenced by the Monument. Elements of the analysis include demographics, land ownership and use, lifestyle, attitudes, values and beliefs, employment and income, and forest contributions.

Demographics

Demographic information provides a general description of the population of a community or region. It allows the decision maker and the public to understand trends and changes within an area's population and how those trends influence or are influenced by public land management. Demographics also identify potential social and economic impacts for specific groups that are defined by age, race, etc.

The characteristics of the population variables considered for this analysis include population and growth trends, age composition, ethnicity, and individuals below the poverty level (environmental justice). Where possible, explanations of trends that are not typical of the State are provided. Otherwise, trends are assumed to reflect some preference or response to natural, physical, or political framework, and would be expected to continue in the future.

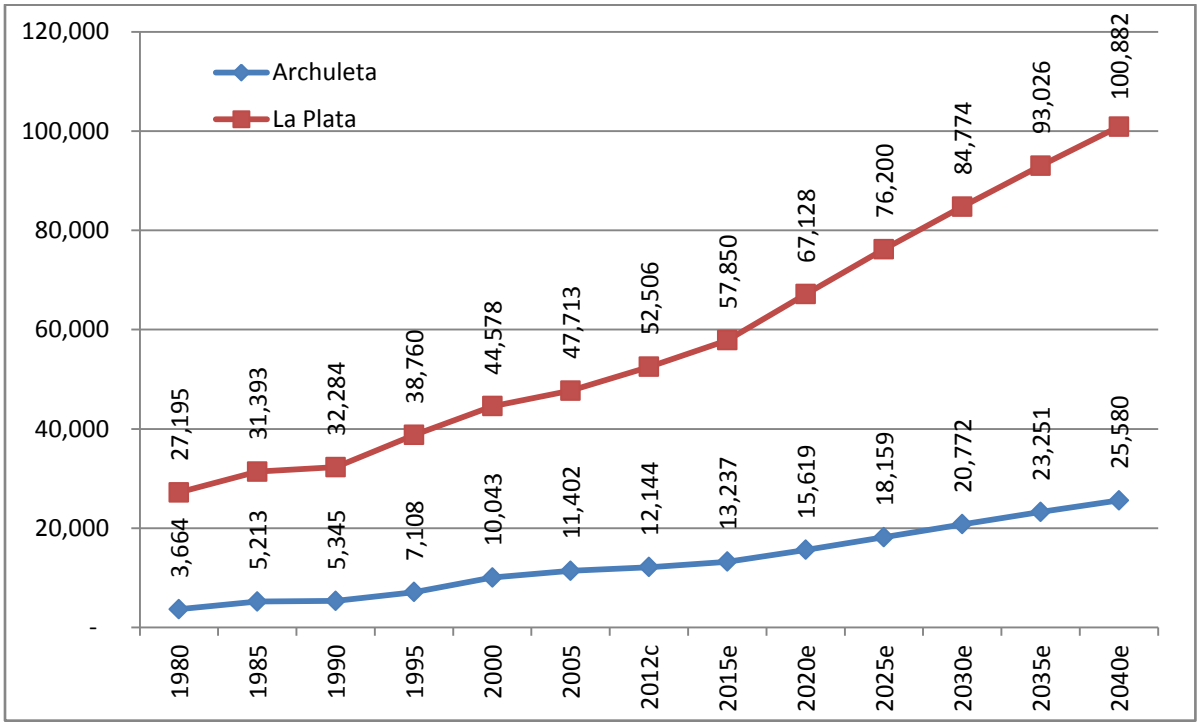
Population

Population is an important variable to consider because the ability to attract and retain individuals to live and work within an area is critical to the survival of a community and its economy. Population statistics only account for permanent residents. However, seasonal workers, who are often missed in the April census count, and second home owners who are not counted, are temporary residents that are also important to the local economy and community.

Population and Growth Trends

Overall, the study area's population increased by 18 percent from 2000 to 2012 (Figure 8). La Plata County saw an 18 percent increase during this period, and Archuleta County saw a 21 percent increase. The Colorado Demography Office estimates both counties to continue to see increases in population through 2040, however, slowing by about 2 percent every 5 years.

Figure 8: Population Estimates and Forecasts for Archuleta and La Plata Counties, 1980-2040



Source: Colorado Demography Office; 2012c is most current data
e = estimated population

Age of Study Area Population

Historically, Archuleta County's population has been older than the Colorado median age (Table 3). La Plata County's population was about the same median age as the State's in 1990, and was close to the State's median age in 2000 and 2010. La Plata County's population has consistently been younger than Archuleta County's over the time analyzed. In forecasted levels for 2020, 2030 and 2040, Archuleta County continues to age more extensively than La Plata County and the state's median age. La Plata County's age is projected to be very similar to the state, reflecting the overall trend that the population of Colorado will age as more retirees 65 and older select communities around Colorado to settle in. This shift toward an older population will manifest itself in many ways, from preferred outdoor recreation activities on public lands, to the services locals demand from their local government, and the business mix of retail and services offered on Main Street.

Table 3: Median Age by County and State, 1990-2040

Year	Archuleta	La Plata	Colorado
1990	36.1	32.3	32.7
2000	41.1	35.6	34.4
2010	48.4	38.4	36.1
2020	*49.4*	*37.7*	37.5
2030	*48.7*	*38.2*	38.1
2040	*48.3*	*38.5*	*38.7*

Source: Colorado Demography Office

Race and Ethnicity Composition of Study Area Population

Population changes relate not only to the number of residents in the region, but also to their race and ethnicity. Table 4 highlights the race and ethnicity components of the counties in the study area. Except for the American Indian population, the area is not racially diverse with 90 to 94 percent of the population being classified as white in 2012.

Table 4: Race and Ethnicity Component of Study Area Population by County, 2012

Area	Total Population	White	Black	American Indian	Asian or Pacific Islander	Other/ Multi-Race	Hispanic or Latino, Any Race[4]
	- - people - -	- - - - - - - - - - - - percent of population- - - - - - - - - - -					
Archuleta	12,070	93.6	0.4	2.9	1.0	2.2	17.9
La Plata	52,401	89.7	0.5	6.5	0.8	2.4	12.3
Colorado	5,189,458	88.1	4.3	1.6	3.2	2.8	21.0
Source: U.S. Census Bureau, 2012.							

Parts of the Southern Ute Indian Reservation are within Archuleta and La Plata Counties and parts of the Ute Mountain Ute Indian Reservation are within La Plata County. As a result, these counties have a higher percent of American Indian populations than the State as a whole (3 and 7 percent versus 2 percent). The percent of the population for every other non-white racial component is less than the State average.

The racial composition of the region did not change dramatically between 2000 and 2010, although the percentage of the population classified as white decreased slightly and the percentage of the population for other groups increased slightly.

Environmental Justice

Executive Order (EO) 12898 (Environmental Justice in Minority Populations and Low-Income Populations) directs all federal agencies to focus attention on the human health and environmental conditions in minority and low-income populations. The purpose of EO 12898 is to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects on minority or low-income populations that may be considered a community – a group of individuals living in geographic proximity to one another, or a group that would experience common conditions of environmental exposure or effect associated with a plan or project.

For this analysis, poverty data for the two counties has been used to reflect the presence of low-income populations within the study area. Table 5 displays poverty level data for individuals and families by county and the state. Neither county has poverty levels for 2012 that are meaningfully greater than the state averages. Some of the low-income levels in Archuleta County may be associated with the influx of young adults moving into resort areas like Pagosa Springs and Durango (La Plata County) to take

[4] Race and ethnicity in the US Census are self-identification data items in which residents choose the race(s) with which they most closely identify, and indicate whether or not they are of Hispanic or Latino ethnicity. Race and ethnicity are considered separate and distinct identities, with Hispanic or Latino origin asked as separate questions. Thus, in addition to their race or races, all respondents are categorized by membership in one of two ethnicities, which are "Hispanic or Latino" and "Not Hispanic or Latino". (U.S. Census Bureau, 2012)

advantage of the recreational opportunities like skiing and biking, and working as necessary. Similarly, some of persons below poverty level within La Plata County may be associated with students at Fort Lewis College living on low-incomes. The community of Ignacio (La Plata County) also has higher poverty levels than State averages; this community is within the Southern Ute Indian Reservation, and outreach and consultation with the tribe has been ongoing throughout the planning process and is documented in Section 1.6 and Appendix B of this EIS.

Table 5: Poverty Level of Study Area Population by County, 2012

Area	Percent of Persons below Poverty level	Percent of Families below Poverty level
Archuleta County	8.8	7.9
La Plata County	11.1	5.7
Colorado	12.9	10.9
Source: U.S. Census Bureau, American Community Survey 2012		

Table 4 highlights the potential minority populations within the study area; in both counties the American Indian populations are higher than the state average which can indicate the presence of a minority population. Both the Ute Mountain Ute and the Southern Ute Indian Tribe are federally recognized tribes and have been engaged in government to government consultation throughout the planning process with the Forest Service. Section 1.6 and Appendix B of this EIS outlines the meetings and participation offered to the tribes to ensure their issues and concerns were considered and addressed throughout the process.

Land Ownership and Use

The two-county study area covers about 1.9 million acres. Approximately 46 percent of Archuleta County and 37 percent of La Plata County contain NFS lands. Approximately 37 percent of the two counties in the study area are in private ownership. Tribal lands represent about 17 percent of the land in the study area. This ranges from 16 percent in Archuleta County to 18 percent in La Plata County (SJNF, 2014; Forest Service Land Area Report, 2013). Less than one percent of the study area is within urban land cover. The majority of the study area is dominated by forest, grassland, or shrubland. Development has been occurring rapidly within the study area counties, between 2000 and 2010; both counties have seen a large percent change to their residential land area. Archuleta County's residential land area development increased by 43.8 percent, and La Plata County saw a 38.1 percent increase.

Directly adjacent to and surrounding the Monument is a mix of private land, NFS lands, a state wildlife area, and tribal reservation lands. Private lands include working ranches and smaller parcels with private homes in a generally low density rural area. People living around and adjacent to the Monument are a mix of longtime residents, newer residents to the area, and some second home owners. Five nearby landowners submitted comments during scoping. These neighbors to the Monument are mixed in their support of the creation of the Monument with some not being in favor of national monument designation, and some having concerns about the potential impacts of management within the Monument. Comments included concerns that additional use of the Monument could negatively impact their use and enjoyment of their private land (traffic, trespass,

damage to natural resources), concerns about negative impacts to private land values or water rights, and concerns that management activities will have negative impacts to the resources within the Monument.

Social Concerns

Social concerns are broad and complex enough that they do not constitute a single issue that can be easily measured and addressed. Generally, the values people hold toward forest resources is the measure used to assess if alternatives will have positive or negative impacts to various individuals or groups. There are many definitions of value; for this analysis it is assumed that we can understand forest values by understanding what is important to people (Kroger 2003).

Values and Interests

The values and interests included in this analysis are based on comments the public has provided to this process. The identified values and interests are not based entirely on a random sample. People who chose to respond to a Forest Service comment period are self-selected. By focusing on those who commented, the analysis focuses on those people who hold strong values regarding management of the Monument.

Several assumptions underlie this analysis:

- People make choices or reflect their preferences based on what is important to them (Kleindorfer et al. 1993).
- An individual may hold one or more of the values/interests for the natural resources. Consequently, the impacts of the alternatives on specific individuals may be cumulative, mixed, or singular, depending on how many different values the individual holds. For example, a person may hold values similar to those of the preservation category when considering wildlife habitat, but may hold values similar to the non-motorized recreation category when considering access to recreational opportunities.
- Management actions within the Monument that are inconsistent with people's natural values are perceived by them as threatening and undermining to their values.
- The ability of Monument users to continue to engage in current or future use of the NFS lands and to maintain the quality of their experience is tied to the cultural and natural resources found there.

Values and Interests Specific to the Monument include:

- *Protection of the Objects of the Monument* – many people who commented felt that the resources and values that make the Monument significant should be protected and maintained.
- *Multiple Uses* – other people who commented were interested in ensuring that resource management within the Monument continued to consider a variety of multiple uses.
- *Recreation/Cultural Access* – many people commented with a desire to have additional access to the Monument area, both for general recreation as well as to specific areas for continued cultural research.
- *Tribal Opportunities/Cultural Protection* – many comments, several specifically from tribes, were concerned with protecting the cultural resources and values of the Monument, providing continued access to the Monument by tribal members for traditional, cultural, spiritual, and food and medicine gathering purposes, and providing continued opportunities for tribal consultation.
- *Private Land Owners* – these specific commenters were concerned about the value of their property, and how increased use of the Monument could negatively impact their use and enjoyment of their land.

Economic Conditions and Trends

The following sections highlight the economic conditions and trends in the two-county study area. The counties' employment and income data are aggregated and presented as one study area, because this information is useful as indicators of the regional economic structure surrounding the Monument.

Study Area Employment Trends by Industry

Recent employment change in the two-county region by industry is described in Table 6. Industries are organized according to three major categories: non-services related, services related, and government. Employment includes wage and salary jobs and proprietors. The employment data are organized according to the North American Industrial Classification System (NAICS) and reported by place of work.

Table 6: Employment by Industry, 2001-2011

	2001	2011	Change 2001-2011
Total Employment (number of jobs)	38,308	44,251	5,943
Non-services related	7,422	8,318	896
Farm	1,423	1,419	-4
Forestry, fishing, & related activities	234	299	65
Mining (including fossil fuels)	494	1,573	1,079
Construction	4,243	4,136	-107
Manufacturing	1,028	891	-137
Services related	25,398	29,646	4,248
Utilities	146	159	13
Wholesale trade	710	735	25
Retail trade	4,715	4,656	-59
Transportation and warehousing	777	854	77
Information	750	612	-138
Finance and insurance	1,301	2,138	837
Real estate and rental and leasing	2,266	3,215	949
Professional and technical services	2,269	2,858	589
Management of companies	70	139	69
Administrative and waste services	1,354	1,898	544
Educational services	452	756	304
Health care and social assistance	3,123	3,990	867
Arts, entertainment, and recreation	1,419	1,631	212
Accommodation and food services	4,222	3,995	-227
Other services, non-public administration	1,823	2,010	187
Government	5,377	6,491	1,114

Data Sources: U.S. Department of Commerce. Bureau of Economic Analysis, Regional Economic Information System, Washington, D.C. Table CA25N. Data compiled using EPS-HDT.

Total employment in the two-county region increased by about 15% from 2001 to 2011. Services related industries made up over 66% of all employment in the area, representing a 17% growth in the past decade. During the same time period, jobs in non-services related industries grew from 7,422 to 8,318, a 12% increase; while the government sector grew by 21%. The fastest growing industry sectors in the two-county region were government (1,114 new jobs), mining (including fossil fuels) (1,079 new jobs), and real estate, rental, and leasing (949 new jobs). The number of jobs in the accommodation and food

services sector decreased by about 200, while a few other sectors also experienced modest decrease in employment, such as construction, manufacturing, and information.

Study Area Personal Income Trends by Industry

Recent personal income change by industry is described in Table 7. Labor earnings in the two-county region increased by about 35% (in real terms) from 2001 to 2012. Services related industries made up over 59% of all labor earnings in the area, representing a 30% growth in the past decade. However, during the same time period, labor earnings in non-services related industries grew by 69%, while the labor earnings from government sector grew by 39%.

Table 7: Personal Income by Industry, 2001-2012 (thousands of 2013 $'s)

	2001	2012	Change 2001-2012
Labor Earnings	1,376,976	1,864,506	487,530
Non-services related	237,134	399,465	162,331
Farm	2,701	-4,778	-7,479
Forestry, fishing, & related activities	8,260	3,344	-4,916
Mining (including fossil fuels)	27,928	178,341	150,413
Construction	167,094	189,788	22,693
Manufacturing	31,151	32,770	1,619
Services related	847,389	109,4523	247,134
Utilities	13,163	16,413	3,249
Wholesale trade	19,493	50,622	31,129
Retail trade	142,599	138,610	-3,988
Transportation and warehousing	38,382	58,237	19,854
Information	39,726	35,068	-4,658
Finance and insurance	72,186	130,671	58,485
Real estate and rental and leasing	52,166	39,215	-12,952
Professional and technical services	98,992	151,077	52,085
Management of companies	3,675	9,538	5,862
Administrative and waste services	25,767	35,069	9,302
Educational services	12,620	16,928	4,308
Health care and social assistance	140,777	213,629	72,852
Arts, entertainment, and recreation	28,412	28,994	583
Accommodation and food services	90,530	93,082	2,552
Other services, non-public administration	68,901	77,370	8,470
Government	270,691	375,654	104,962

Data Sources: U.S. Department of Commerce. Bureau of Economic Analysis, Regional Economic Information System, Washington, D.C. Table CA05N. Data compiled using EPS-HDT.

From 2001 to 2012, the three industry sectors that added the most new personal income (in real terms) were mining (including fossil fuels) ($150.4 million), government ($105.0 million), and health care and social assistance ($72.9 million). Income from the real estate sector decreased by $12.9 million (in real terms) from 2001 to 2012, while a few other industries also experienced declines in labor earnings, such as the information, retail, forestry, fishing and farm sectors.

Current Employment and Income by Industry

Table 8 shows the employment and average annual wages by industry for 2012. This is the latest data that is currently available for the two-county area. Industries are organized according to three major categories: non-services related, services related, and government. This table shows wage data from the Bureau of Labor Statistics, which does not report data for proprietors or the value of benefits, and uses slightly different industry categories than those shown on the previous two tables.

Table 8: Employment and Wages by Industry, 2012 (2013 $'s)

	Employment	% of Total Employment	Avg. Annual Wages	% Above or Below Avg.
Total	**26,988**		**41,309**	
Private	21,142	78.3%	3,600	-4.1%
Non-Services Related	3,407	12.6%	56,176	36.0%
Natural Resources and Mining	742	2.7%	88,093	113.3%
Agriculture, forestry, fishing hunting	80	0.3%	26,829	-35.1%
Mining (including fossil fuels)	664	2.5%	95,209	130.5%
Construction	2,027	7.5%	51,153	23.8%
Manufacturing (incl. forest products)	636	2.4%	35,124	-15.0%
Services related	17,735	65.7%	36,416	-11.8%
Trade, Transportation, and Utilities	4,963	18.4%	35,113	-15.0%
Information	402	1.5&	55,625	34.7%
Financial Activities	1,664	6.2%	54,950	33.0%
Professional and Business Services	2,033	7.5%	49,767	20.5%
Education and Health Services	3,377	12.5%	45,813	10.9%
Leisure and Hospitality	4,527	16.8%	17,328	-58.1%
Other Services	711	2.6%	28,082	-32.0%
Unclassified	1	0.0%	23,494	-43.1%
Government	5,847	21.7%	47,482	14.9%
Federal Government	435	1.6%	64,112	55.2%
State Government	1,060	3.9%	46,153	11.7%
Local Government	4,352	16.1%	46,144	11.7%

Data Sources: U.S. Department of Labor. 2013. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, Washington, D.C. Data compiled using EPS-HDT.

In 2012, services related industries employed 17,735 people, while the government and non-services related sectors employed 5,847 and 3,407 respectively. The trade, transportation, and utilities sector made up about 18% of all employment in the two-county region, followed by leisure and hospitality (17%) and the local government sector (16%). However, the leisure and hospitality sector was the lowest paying sector (an average annual wage of $17,328) in the two-county region in 2012. The highest paying sector was mining (including fossil fuels).

Unemployment

Table 9 shows the unemployment rate for each month of the year, from 2009-2013. Unemployment rate is the number of people who are jobless, looking for jobs, and available for work divided by the labor

force. The average annual unemployment rate in 2009 was 6.4% in the two-county region. It had increased to over 7% since then, before dropping down to about 6% for the year 2013.

Table 9: Seasonal Unemployment Rate, 2009-2013

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Unemployment Rate (%)											
2009	5.9%	6.4%	6.7%	6.4%	6.6%	6.9%	6.5%	6.0%	5.8%	5.9%	6.4%	7.0%
2010	8.5%	8.6%	8.8%	7.9%	7.3%	7.4%	7.2%	7.1%	6.8%	7.0%	7.7%	7.6%
2011	8.8%	8.7%	8.3%	7.5%	7.3%	7.4%	7.3%	6.9%	6.7%	6.7%	7.0%	7.1%
2012	8.4%	8.4%	8.1%	7.3%	6.9%	7.3%	7.1%	6.7%	6.2%	6.1%	6.2%	6.6%
2013	6.9%	7.1%	6.7%	6.0%	5.6%	6.4%	5.7%	5.6%	5.5%	5.1%	5.2%	

Data Sources: U.S. Department of Labor. 2013. Bureau of Labor Statistics, Local Area Unemployment Statistics, Washington, D.C. Data compiled using EPS-HDT.

Environmental Consequences

Social Conditions and Trends

None of the alternatives would change the demographic conditions and trends described in the affected environment. Any increasing or changing population growth, or changes in age and racial diversity would have some impact on NFS lands in terms of the types of resources and opportunities people might demand from their public lands. The effects of increasing demands for the resources in the Monument are discussed in other sections of this EIS.

Social Concerns and Values

Public comments generally revealed strong support for management of the Monument from individuals and groups who value the objects of the Monument. However, there are some differences in opinion in how those objects should best be managed into the future for both use and for preservation. Some private land owners surrounding the Monument were not in favor of the area being designated a Monument and continue to be concerned about the potential decrease in their property values. Generally, studies have shown private property values near public lands to sell for a premium, although in some cases such as military installations, values are negatively affected (Ham et al., 2014). No analysis of private land values was conducted for this analysis, but based on the natural amenities of the area it is assumed that private property values are unlikely to change due to the activities proposed under any alternative.

Each of the alternatives differs in the balance point between key conflicting values. Effects on values and interests are described in terms of the key categories identified above. The analysis presented by alternative below uses public comments for each category to describe the potential effect of and differences between the alternatives.

Alternative A (No Action)

Protection of the Objects of the Monument – The No Action Alternative is likely to be the least favored of people with this interest since a site-specific management plan will not be written. While this alternative will continue to protect the objects of the Monument by complying with the proclamation and the LRMP, no additional efforts are made to increase interpretation or access.

Multiple Uses – Because the No Action Alternative currently allows for a variety of uses within the Monument, this alternative would be favored by this interest. There is a chance that some uses may be curtailed in the future if needed for protection of the objects of the Monument, but at present, uses would continue under the existing LRMP.

Recreation/Cultural Access – With limited opportunities to expand recreational access, this is likely to be the least favored alternative for this interest. The current level of developed recreation would be the opportunities available under the existing LRMP.

Tribal Opportunities/Cultural Protection – Under all alternatives, cultural resources would be protected and tribal consultation would continue. In addition, tribal access to the Monument for traditional cultural, spiritual, and food and medicine gathering purposes would be preserved under all alternatives. The No Action Alternative is likely to be less favored by tribal interests since a site-specific management plan will not be written for the Monument.

Private Land Owners – This may be the favored alternative for some of the private land owners around the Monument as it maintains the level of facilities at the current level and does not offer additional recreation opportunities. However, given past trends in visitor use (slow increases in visitor use over the past few decades), and the increased awareness of Chimney Rock following its designation as a national monument, it is assumed that visitor use will continue to slowly increase. If user numbers do continue to increase and the current facilities are overused, some of the private landowners concerns about traffic and parking could occur if facilities on NFS land are not up to capacity.

Alternative B

Protection of the Objects of the Monument –Alternative B is likely to be favored by those interested in protecting the objects of the Monument because a site-specific management plan will be written and there would be less development of facilities compared to Alternative C.

Multiple Uses –Alternative B may be less valued by those interested in having the Monument open for multiple uses because the Monument will be closed to livestock grazing and dispersed camping. Overall, there will be fewer multiple use opportunities across the Monument under Alternative B.

Recreation/Cultural Access –Alternative B would likely offer this interest group much of the additional access and facilities they are interested in that are not currently provided for in the No Action Alternative. The mix of commercial and non-commercial use provides access for a variety of users to come to the site and have facilities to aid their visit.

Tribal Opportunities/Cultural Protection – As with the other alternatives, cultural resources would be protected and tribal consultation would continue. In addition, tribal access to the Monument for traditional cultural, spiritual, and food and medicine gathering purposes would be preserved. This alternative is likely to be more favored by tribal interests since a site-specific management plan will be written to help further protect the cultural resources and values of the Monument. They may also prefer this alternative because it proposes less development within the Monument as compared to Alternative C.

Private Land Owners – Some land owners may favor this alternative more than the No Action Alternative as it provides more infrastructure for visitors to focus activity within the Monument rather than providing limited opportunities and potentially having visitors impact surrounding private lands. However, some

landowners may still be concerned that any development may create increases in visitation that would increase conflicts between their interests and values and the Monument users.

Alternative C

Protection of the Objects of the Monument – Like Alternative B, Alternative C is likely to be more favored by those interested in protecting the objects of the Monument and offering opportunities for access to the Monument than the No Action Alternative. This Alternative provides for the most development and longest operating seasons and may therefore create the most impacts to the objects of the Monument, and would be less favored by this group than Alternative B.

Multiple Uses – Alternative C allows for a variety of uses within the Monument, but with additional management considerations put forth in the site-specific management plan, so reaction to this alternative from people with this interest may be mixed. As in the No Action Alternative, dispersed camping and livestock grazing would continue to be allowed. Depending on the impact of the management plan to individuals, some may prefer this alternative, and some may still prefer the No Action Alternative.

Recreation/Cultural Access – Alternative C would be the most favorable for this interest group because it offers the most opportunities for additional access and facilities as compared to the other alternatives. The mix of commercial and non-commercial use provides access for a variety of users to come to the site and have facilities to aid their visit.

Tribal Opportunities/Cultural Protection – As with the other alternatives, cultural resources would be protected and tribal consultation would continue. In addition, tribal access to the Monument for traditional cultural, spiritual, and food and medicine gathering purposes would be preserved. This alternative is likely to be less favored by tribal interests than Alternative B because it proposes more development within the Monument.

Private Land Owners – Some land owners may favor this alternative more than the No Action Alternative or Alternative B as it provides the most infrastructure for visitors to focus activity within the Monument rather than providing limited opportunities and potentially having visitors impact surrounding private lands. However, some landowners may still be concerned that any development may create increases in visitation that would increase conflicts between their interests and values and the Monument users.

Table 10: Social Concerns and Values Summary

Monument Values and Interest	Alt A- No Action	Alternative B	Alternative C
Protection of the Objects of the Monument	Not Favorable	Favorable	Less Favorable
Multiple Uses	Favorable	Not Favorable	Mixed
Recreation/Cultural Access	Not Favorable	Favorable	More Favorable
Tribal Opportunities/Cultural Protection	Less Favorable	More Favorable	Less Favorable
Private Land Owners	Neutral	Mixed	Mixed

Regional Economic Contributions from Monument Visitors

Management of the Monument contributes to the local economy by providing tourism opportunities. Visitors to the Monument, from nearby counties and from afar, spend time and money in the local communities. A regional economic contribution analysis is performed in order to estimate the direct and secondary economic effects of visitor spending brought to the local economy. These economic effects occur through several stages. For example, visitors to the Monument incur a number of expenditures (fuel for vehicles and food and other incidental supplies) on their trips. These expenditures constitute the direct inputs to the local economy from visitations. Those industries directly interacting with visitors also require inputs from other sectors in the local economy – other goods, services and labor to run their businesses. These are called indirect effects. Additionally, people spending wages earned in any of those industries also provide income to other goods and service sectors; they are the induced effect. Indirect effects and induced effects can be summarized as secondary effects. Economic input-output models can capture these complex interactions between producers and consumers and estimate the secondary effects of visitor spending through regional economic multipliers. Specific regional economic multipliers for the Monument study area (Archuleta and La Plata counties) are calculated through IMPLAN[5]. IMPLAN (IMpact analysis for PLANing) is a commercially available software and data system, originally developed by the Forest Service and now updated annually and operated by the IMPLAN Group, LLC (www.implan.com).

A 2012 IMPLAN model (the latest available data as of 2014) for the Monument study area (Archuleta and La Plata counties) was constructed in order to generate regional economic multipliers representing Archuleta and La Plata counties. The economic effects in terms of employment, income and economic activities from Monument visitors can be then estimated with two additional pieces of information: (1) the number of visitors to the Monument on an annual basis, and (2) visitor expenditures.

Based on participation in tours and special programs, the number of annual visitors to the Monument was 8,600 for the year 2013. These figures do not include visits by people accessing the site during non-tour hours or the off-season.

Visitor expenditures used in this effects analysis are adapted from a recent local study on the Monument (Information Services, 2014). This report was funded by the Region 9 Economic Development District for Southwest Colorado, Inc. to estimate the economic value of Chimney Rock National Monument. The Forest Service does not collect site specific information that would be useful to an analysis at this scale. The Forest Service uses the National Visitor Use Monitoring Survey to determine use, trends and economic impacts at the forest level, but that data is not statistically valid for a site specific analysis. So, while the Information Services methodologies may not be parallel to Forest Service methods, the expenditure data collected represent the only site specific data available for modeling of potential impacts. It should be remembered that as with any modeling exercise, these are estimates of visits and a variety of outside factors, such as gas prices, weather, fire seasons, etc., will impact the actual numbers of people who decide to visit CRNM on any given year.

[5] This analytical approach (Input-Output modeling via IMPLAN) is generally consistent with methods used in other economic effects analyses, such as recent studies by the National Park Service (Cullinane-Thomas et al, 2014) and Information Services (2014).

The 2014 report by Information Services contained data such as visitor expenditures by accommodation types ($174/person/day on average; $103/person/day for visitors without accommodation cost), the proportion of local vs. non-local (80%) visitors, as well as proportion of overnight visitors (87%). These are important parameters for calculating the expenditures – and subsequent economic effects – from different visitor market segments. Differentiating visitor segments is important because, for example, a local visitor on a day trip can have a very different spending pattern compared with a non-local visitor on an over-night trip. This analysis distinguishes between local vs. non-local visitors as well as visitors on day trips vs. overnight trips. Using the annual visitation estimate (8600 visits) in conjunction with the visitor segment information, annual visitations as well as total direct expenditures are estimated for four different market segments: local visitors on day trips, local visitors on over-night trips, non-local visitors on day-trips and non-local visitors on over-night trips (Table 11).

Table 11: Estimated Annual Local and Non-Local Visitations and Expenditures by Market Segments

Visitor Market Segments	Annual Visits	Expenditures (2013$/Person/Visit)	Total Direct Expenditures (2013$)
Non-Local Day Trips	894	$103	$92,123
Non-Local Overnight	5,986	$174	$1,041,494
Local Day Trips	224	$103	$23,031
Local Overnight	1,496	$174	$260,374
Total	**8,600**	**-**	**$1,417,022**

Total visitor expenditures ($1.4 million 2013 dollars) represent the direct economic input from Monument visitors to the local economy. Non-local visitors (not from Archuleta or La Plata counties) staying overnight make up the majority of the total spending; while local visitors on day trips spent the least. With these direct expenditures by market segment figures, economic contributions from Monument visitors are estimated through the abovementioned IMPLAN regional economic multipliers specific to the two-county area. The economic effects presented in Table 12 are expressed in terms of employment, labor income and total value added (Gross Regional Product, or GRP) contributed to Archuleta and La Plata counties from Monument visitor spending. Employment figures are rounded to the nearest whole integer while income and value added dollar amounts are rounded to the nearest thousand

On an annual average basis, Monument visitor expenditures directly support or sustain approximately 14 jobs, $388 thousand in labor income, and $655 thousand in total value added in Archuleta and La Plata counties (Table 12). The secondary effects (indirect plus induced effects) of visitor spending support or sustain a few additional jobs, $114 thousand in labor income and $192 thousand in total value added. Combined, on an annual average basis, Monument visitor spending supports or sustains approximately 17 jobs, $503 thousand in labor income and $847 thousand in Total Value Added in the two-county analysis area.

Table 12: Estimated Annual Average Economic Contributions from Visitor Spending at the Monument

	Employment			Labor Income (2013 $)			Total Value Added (2013 $)		
	Direct	Secondary	Total	Direct	Secondary	Total	Direct	Secondary	Total
Non-Local Day Trips	1	0	1	$26,000	$6,000	$32,000	$40,000	$11,000	$51,000
Non-Local Overnight	11	2	13	$287,000	$87,000	$375,000	$491,000	$146,000	$637,000
Local Day Trips	0	0	0	$6,000	$1,000	$7,000	$9,000	$3,000	$12,000
Local Overnight	2	0	3	$69,000	$19,000	$89,000	$114,000	$33,000	$146,000
Total Local	**2**	**1**	**3**	**$75,000**	**$21,000**	**$96,000**	**$123,000**	**$35,000**	**$158,000**
Total Non-Local	**12**	**2**	**14**	**$313,000**	**$94,000**	**$407,000**	**$532,000**	**$157,000**	**$689,000**
Grand Total	**14**	**3**	**17**	**$388,000**	**$114,000**	**$503,000**	**$655,000**	**$192,000**	**$847,000**

It is important to note that all employment figures as estimated through IMPLAN are expressed as annual averages of both full and part time wage and salary jobs, as well as self-employed jobs. This accounting method is a standard approach, and used by the U.S. Bureau of Labor Statistics[6]. Labor incomes include wages, benefits and proprietor's income. Lastly, Total Value Added consists of (1) employee compensation –wages and salaries plus benefits paid by local industries; (2) proprietor income – income from self-employment; (3) other property income – corporate income, rental income, interest and corporate transfer payments; and (4) indirect business taxes – sales, excise, fees, licenses and other taxes paid, including non-income based payments to the government. Total value-added represents the Gross Regional Products for the two-county area, which contribute to the Nation's GDP. Total value added is a popular and widely used measure of economic growth, taking into account the incremental value added to a product or service at each step of the production process.

Distinguishing economic effects from local vs. non-local visitor spending

As seen in Table 12, all economic effects are split by local vs. non-local visitors. Many analysts maintain that since recreation spending by people living within the impact area does not constitute 'new money' entering the economy, their spending and subsequent effects should be left out. This type of treatment is exercised in economic impact analyses. The results can be interpreted as economic activities that would likely be lost from the local economy if visitation opportunities ceased to exist, implicitly ignoring substitution effects. In contrast, economic contribution analysis is another approach used to analyze economic effects. Under this approach, expenditures by both local as well as non-local visitors are included (as summarized in the last row of

[6] This employment accounting approach means that it is not possible to discern the number of hours worked or the proportion that is full time vs. part time. It is also important to reiterate the employment contributions calculated are reported simply as jobs, not full time equivalents (FTE). These include both full time and part time employment on an annual average basis, so a person with more than one job could show up more than once in the data. This prohibits comparisons to population data and inferences about the effect on unemployment rates.

Table **12**: grand total). The objective of contribution analyses is not to describe the net changes to the economic base of a regional economy that can be attributed to the inflow of new money, nor to concoct the economic effects in the region if the Monument ceased to exist. Rather, contribution analysis describes the relative magnitude and importance to local economies of the economic activities supported through national forest visitor spending. One way to interpret the implication of accounting for both local and non-local visitations that occurred (or, estimated to have occurred) on a given NFS unit, is that it attempts to capture people's preference toward the amenities and natural settings of their national forests. This preference translates into visitors (residents and non-residents alike) spending their disposable income as well as valuable leisure time on trips to national forests, versus trips to private fishing ponds or the outlet mall.

A note on model sensitivities

IMPLAN generates a static model which represents and reflects a snapshot in time for the underlying economic structure of a regional economy. Since this analysis used a 2012 IMPLAN dataset (best available data from IMPLAN, LLC. as of 2014), the results reflect only the structure and state of the economy in 2012. Moreover, IMPLAN is used to examine "marginal" changes; therefore, results in this analysis are valid only for relatively small changes to the local economy. In other words, the above results hold with the assumption that there is no substantial management action in the region large enough to change the underlying economic structure and trade relationships of the local economies. Because IMPLAN can be described as a quasi-linear process, and since all economic effects estimated in this analysis are driven by visitation level, the resultant economic effects (in terms of employment, income, and value added) could change in the same direction, given a change in visitation level, holding everything else constant. To provide some perspective, it should be noted that even if a small / moderate increase in visitation is assumed (e.g. 5%), due to the nature of the model as well as the underlying economic structure of the analysis area, the resultant change in the estimated economic effects could be questionable if presented as a means to compare impacts across alternatives[7].

All Alternatives

As described above, all economic effects are driven by visitation level in the calculation of this analysis. This analysis does not include an estimate for projected visitation level under any of the alternatives (see Existing Conditions and Trends for Recreation Resources). Without a projected figure in visits, all economic effects as presented in Table 12 would remain unaffected for all alternatives.

Cumulative Impacts

Social Environment

Throughout its history, the Chimney Rock area has provided a wide range of important values to a wide range of people, and will continue to serve a wide variety of values and uses for many people over time. With an increase in interest and pressures throughout public lands for multiple uses, along with a growing population both locally and at the state level, it may be difficult to respond to those who value the area as it

[7] A 5% increase from current visitation level (8,600 visits/year) translates to 9,030 visits/yr. Using this figure, the Archuleta and La Plata counties IMPLAN model and calculations were re-run, resulting in an increase of 0.84 jobs (direct, indirect and induced effects) supported or sustained in the two-county area. Besides being a static model, IMPLAN's results do not include any confidence intervals; reporting an employment effect of less than one job, for instance, can be misleading and, meaningless at best.

is now and desire no change. Management of the area will need to respond to increases in use and the need to protect the objects of the Monument in a variety of ways, including through site development, construction of trails, and construction of other improvements and visitor facilities to accommodate increased use. Other foreseeable future activities that may impact people's values and interests include grazing, fuels treatment, prescribed burning, and the potential for development of valid existing leases. Implementation of these activities may change the way people relate to the Monument. Direction provided by the LRMP, the proclamation, and the Chimney Rock Management Plan will allow for the multiple uses that are desired by some people, while still protecting access to the Monument and protecting the objects of the Monument. The proposed action, combined with past, present, and foreseeable future activities will likely result in both positive and negative cumulative impacts to the social environment.

Economic Environment

All economic effects are driven by visitation level in the calculation of this analysis. Visitation levels, and past, present, as well as foreseeable future managements' effects on recreation visitor use over time are discussed under Recreation in Section 3.3. Given the relationship between current visitation (8,600 annual visits) and the resultant estimated economic contributions (i.e. about 17 jobs supported), it is important to note that even if visitation would unexpectedly increase dramatically, it is not likely to have a significant impact on the economic environment of the analysis area. A review of the economic environment in the analysis area can provide further context. For example, information about total employment trends in the two-county analysis area (Table 8) gives perspective on the very limited contributions attributable to visitors of the Monument. The unemployment rates from recent years are testament of the fact that the economic environments are, by nature, constantly changing: the average annual unemployment rate in 2009 was 6.4% in the two-county region. It had increased to over 7% since then, before dropping down to about 6% for the year 2013 (Table 9). In summary, communities within the two-county area both impact the socioeconomic environment and evolve along with it; Monument visitations will continue to contribute – in a limited manner – to the overall economic condition of the two-county area.

3.6 Minerals and Geology

Surface geology at Chimney Rock consists of the sedimentary strata of the Lewis Shale (oldest), Pictured Cliffs Sandstone, and the Fruitland Formation (youngest). Dakota Sandstone underlies the area at depth. Slopes in the area vary from alluvial flats and shale slopes to sheer sandstone cliffs.

This geology provides the foundation of the dramatic landscape setting found within the Chimney Rock National Monument. The dominant geologic feature of the Monument is the pair of towering sandstone spires known as Chimney Rock and Companion Rock. The prominent ridgelines within the Monument, including the 4.4 mile long cuesta known as Peterson Ridge, served as the location for many of the structures built by the Ancestral Puebloans. The ridgelines of Chimney Rock and Peterson Ridge command excellent vantage points from which to observe the surrounding landscape and the astronomical phenomena framed by Chimney Rock and Companion Rock.

Affected Environment

Geologic History

The origin of the Dakota sandstone and the geologic formations known as Chimney Rock, Companion Rock, and Peterson Ridge began in a shallow sea about one hundred million years ago during the Cretaceous period. Clay, dead plants, and animals built a layer of mud approximately one thousand feet thick, causing the sea floor to settle as the western continent began to rise.

As the continent rose the interior sea filled with fine sand from erosion of the new mountains. As the sea drained and shrank, its shoreline with beaches, tidal flats, and river deltas followed, burying the ancient mud of the sea floor. Subsequently, wetlands, clam flats, and peat swamps developed, leaving the layers of fossil shells and coal seams which can be observed in the area today.

Beginning about 40 million years ago, orogenic uplift and volcanic activity lifted the entire Colorado Plateau. Water and wind began to erode the rock and soil covering the future site of the rock towers. Glaciers during the Ice Age four million years ago contributed to this erosion. As the last ice melted and floods washed away the debris, thick hard sandstone was exposed. The ancestral Piedra River, with melting glacier ice and heavy rainfall, carved away at the softer sea-floor mud, leaving a wall of hard sandstone more than 1,500 feet high. Geomorphological processes, including wind, rain, earthquakes, and seasonal temperature changes, eroded and shaped the sandstone into the towers and slick rock areas of the Monument.

The grasslands and coniferous forests in the Monument grow on Quaternary age alluvium - 12,000-year-old soil and clay of ground-up rock deposited by the Piedra River and Stollsteimer Creek during the last floods of the Ice Age. In some areas of the Monument below the cliffs and towers, the dark gray and black layers of the ancient sea floor mud is exposed. This is the Late Cretaceous age Lewis Shale (80 million years old). Rich in carbon from sea life, this rock breaks down easily and weathers into the fine adobe clay that was used as mortar and plaster for stone buildings and for pottery.

The Cretaceous Pictured Cliffs Sandstone formation (70 million years old) overlays the Lewis Shale, and is about 300 feet thick in the Monument. This formation forms slick rock areas within the Monument, as well as the main cuesta, the twin spires, and Peterson Ridge. Its hard fractured sandstone provided building blocks for stone buildings. Snaking trails of brown and black iron stained tracks are often present in weathered slick rock surfaces of the Pictured Cliffs sandstone. These tracks are the fossil traces of a small crustacean called "*Orphiomorpha*", named for the snake-like shape of its burrows. These small creatures, probably crustaceans like today's sand shrimp, burrowed through the wet sands of the ancient beach for food. Their burrows were stabilized by mucus, leaving the indentations of their feet in the walls. These burrows eventually filled with fine clay and iron-rich mud, hardening into the "corncob" trackways visible throughout the Pictured Cliffs Sandstone.

The 400-foot-thick Late Cretaceous Fruitland Formation is the youngest of the geologic layers (68 million years old) and overlays the Pictured Cliffs sandstone. The Fruitland Formation is composed of the compacted remnants of the swamps, floodplains, and peat bogs that filled in the old sea basin and buried the sands of the ancient beaches and lagoons. These ancient swamps and bogs have been converted into coal seams and natural gas in certain layers within the Fruitland Formation. Most of the Fruitland Formation has been eroded away in the Monument, exposing the underlying Pictured Cliffs sandstone.

Minerals

Mineral Potential: There is low to moderate potential for natural gas production from the Dakota Sandstone, moderate to high potential for natural gas production from the Mancos Shale at depth, and known reserves of coal and natural gas in the Fruitland Formation. The area has low to no potential for oil or for occurrence of locatable minerals, including base or precious metals. Moderate potential exists for minor amounts of saleable minerals (construction/decorative stone/gravel), and collectible fossil material occurs throughout the area.

Mineral Ownership and Valid Existing Rights: Within the 4,726 acre Monument, 3,895 acres are under federal mineral ownership and 831 acres are privately owned. All 3,895 acres under federal mineral ownership have been withdrawn from mineral entry by the proclamation. The proclamation states:

> *"All Federal lands and interests in lands within the boundaries of the monument are hereby appropriated and withdrawn from all forms of entry, location, election, sale, leasing, or other forms of disposition under the public lands laws, including withdrawal from location, entry, and patent under the mining laws, and from disposition under all laws relating to mineral and geothermal leasing. Lands and interests in lands within the Monument's boundaries not owned or controlled by the United States shall be reserved as part of the Monument upon acquisition of ownership or control by the United States."*

Although all federal minerals within the Monument are withdrawn, the establishment of the Monument was subject to valid existing rights. The proclamation states:

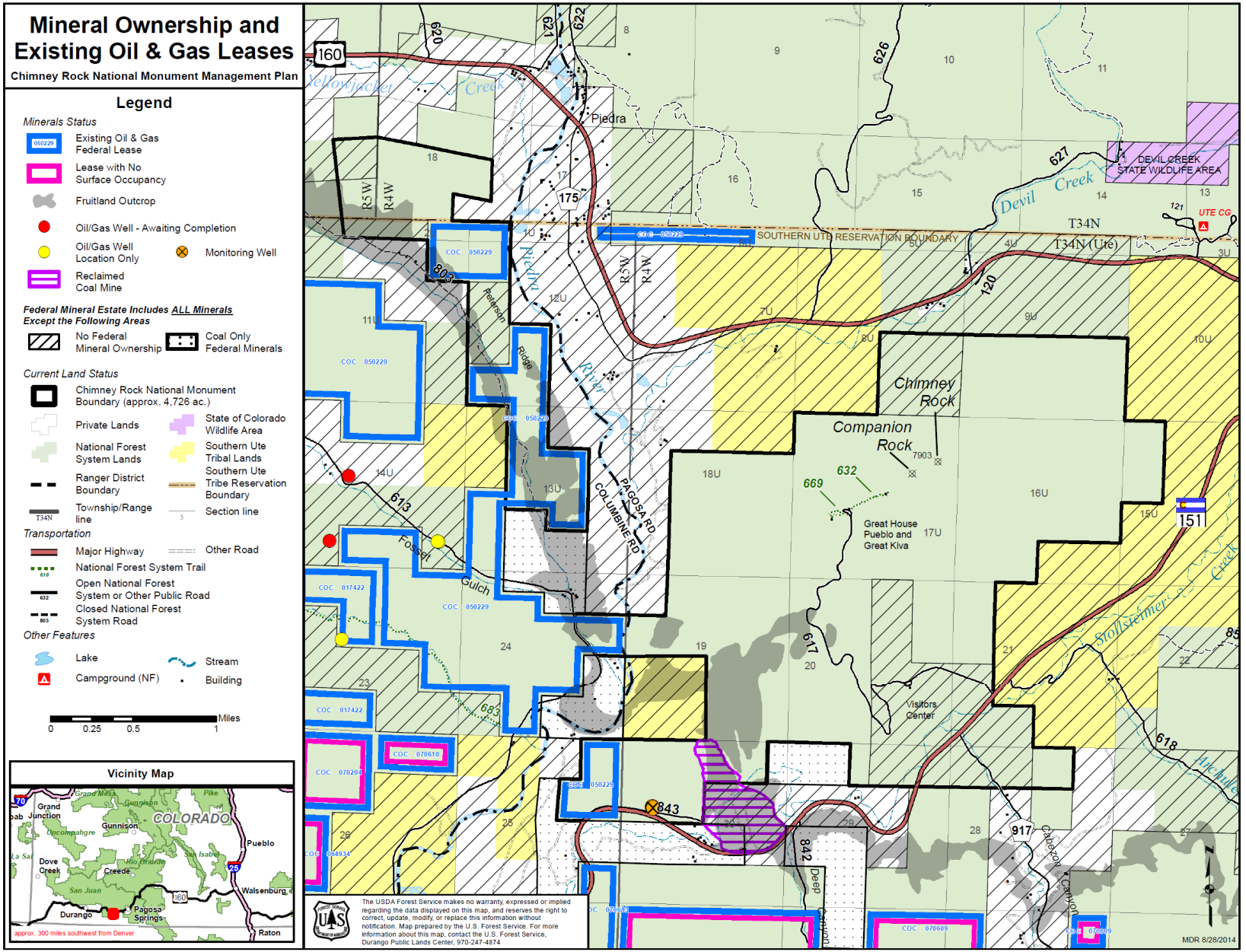
> *"The establishment of this monument is subject to valid exiting rights. The Secretaries of Agriculture and the Interior shall manage development under existing oil and gas leases within the Monument, subject to valid existing rights, so as not to create any new impacts that would interfere with the proper care and management of the objects protected by this proclamation."*

There is currently one valid existing oil and gas lease that was issued prior to the establishment of the Monument. A portion of federal lease COC 050229 occupies approximately 551 acres of the west side of the Peterson Gulch area and the southwestern portion of the Monument. To date, no development of this lease has occurred within the Monument. The portion of lease COC 050229 within the Monument is not part of the Northern San Juan Basin EIS project area.

The 831 acres of private minerals under NFS surface are privately owned because the subsurface estate was retained in private ownership when these lands were acquired. The possibility exists that the privately owned mineral resources may be developed at some point in the future, although to date there has been no stated interest in such development. Figure 9 shows the location of the valid existing oil and gas lease and the location of privately owned minerals within the Monument.

Monitoring Wells: There are also two monitoring wells in the NW ¼ of Section 30. These wells gather Fruitland Formation gas reservoir information and were established to satisfy the monitoring requirements of the Northern San Juan Basin Coal Bed Methane Development Record of Decision. They are operated by the Colorado Oil and Gas Conservation Commission under a 20 year Special Use Permit (SUP) issued by the USFS in 2008. The location of these wells is shown in Figure 9.

Figure 9: Mineral Ownership and Existing Lease Locations



Coal: Approximately 27 acres of the Chimney Rock Coal Mine was located on NFS lands that are now part of the Chimney Rock National Monument (refer to Figure 9). The mine was located near the southwest corner of the Monument in the Fruitland Formation. Operations on the portion of the mine on NFS lands began in 1983. The mine closed in 1986 and has since been reclaimed. This lease has since expired, and there are no other mining claims within the Monument. There is no potential for future coal mining on the portion of the Monument under federal mineral ownership since the proclamation has withdrawn the area from location, entry, and patent under the mining laws.

Environmental Consequences

Guidance for the management of mineral resources is set forth in the 2013 LRMP; the Chimney Rock Management Plan supplements this guidance with desired conditions, objectives, standards, and guidelines specific to the geologic and mineral resources of the Monument. Under Alternative A, the Monument will be managed in accordance with the 2013 LRMP and the proclamation. Alternative B and C will utilize direction found in the LRMP, the proclamation, and the Chimney Rock Management Plan.

All Alternatives

Under all alternatives, existing impacts to mineral and geologic resources are expected to continue in their current scope and intensity. Geologic processes would continue to shape the landscape over time. Development of the valid existing oil and gas lease and reserved and outstanding (private) minerals within the Monument could occur at any time. This potential development would be permitted and managed in accordance with 36 CFR 228 and 251 regulations and 2013 LRMP guidance, keeping impacts to a "reasonable" level. "Reasonable" surface use is determined through environmental analysis appropriate to the situation and implemented in compliance with stipulations, standard practices, applicable BMPs, guidelines for surface-disturbing activities, and applicable laws, standards, and policies, as well as with all USFS and BLM policies and regulations. The application of standards, and guidelines found in the Chimney Rock Management Plan would provide additional guidance and strategies to further minimize impacts from mineral development under Alternatives B and C. If any development is proposed on the existing lease or for the development of reserved and outstanding (private) minerals in the future, site-specific environmental analysis appropriate to the situation will be completed at that time.

Cumulative Impacts

There are several past and present actions that have impacted mineral availability within the Monument. The designation of the Chimney Rock Archeological Area in 1970 and the subsequent withdrawal of much of the archeological area from mineral entry reduced the amount of area available for leasing. The designation of the Chimney Rock National Monument in 2012 and its withdrawal from mineral entry further reduced the area available for leasing. In addition, the 2013 LRMP contains numerous standards and guidelines regulating surface-disturbing activities, such as those that may occur during oil and gas lease development. The proclamation and the proposed Chimney Rock Management Plan supplements this direction with additional standards and guidelines related to surface-disturbing activities. Future foreseeable actions related to the mineral resource include development of the valid existing lease and the reserved and outstanding (private) minerals within the Monument.

The combination of these past, present and future activities may have a minor cumulative impact on the amount of area available for mineral entry, but it will not have a cumulative impact on the ability to develop the valid existing oil and gas lease or the reserved and outstanding minerals within the Monument.

3.7 Air Quality

Affected Environment

Regulatory Environment and Regional Attainment Status

The Clean Air Act (42 USC 7401 et seq. as amended in 1977 and 1990) is the principal federal statute governing air pollution. The Clean Air Act empowered the U.S. Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. These pollutants are called "criteria" air pollutants and include carbon monoxide (CO), ozone, nitrogen dioxide (NO2), sulfur dioxide (SO2), lead, particulate matter equal to or less than 10 microns in diameter (PM10), and fine particulate matter equal to or less than 2.5 microns in diameter (PM2.5). The NAAQS include primary standards designed to protect human health and secondary standards to protect public welfare, including visibility and damage to crops and vegetation.

Regions of the country that meet the NAAQS are considered "attainment" areas, and regions that do not meet the NAAQS are designated as "nonattainment" areas. Certain rural parts of the country do not have extensive air quality monitoring networks; these areas are considered "unclassifiable" and are presumed to be in attainment with the NAAQS. The Monument is located within Archuleta County, which along with the southwestern Colorado counties of Dolores, La Plata, Montezuma, and San Juan, comprises Colorado Air Quality Control Region (AQCR) 9. With the exception of the Pagosa Springs PM10 Attainment/ Maintenance Area, air quality in AQCR 9 falls into the categories of either "better than national standards" or "unclassifiable/attainment" for all criteria air pollutants (EPA 2011). Based on this general classification of the AQCR, air quality within the Monument would generally be considered good. Additional information regarding air quality at the regional level can be found in Section 3.12 of the LRMP.

Local Air Quality Conditions

The central portion of Pagosa Springs was designated as a moderate nonattainment area for the PM10 NAAQS in 1990. The Monument is located approximately 16 miles west of the portion of Pagosa Springs that was designated nonattainment. As a result of this nonattainment designation, the State Implementation Plan for the Pagosa Springs area was amended and included several mandatory control measures including paving 6.5 miles of unpaved roads, adoption of street sanding controls and other street sweeping requirements, control of emissions from stationary sources, federal motor vehicle emission controls, and a series of voluntary and state-only control measures. According to the Final Revised PM10 Maintenance Plan (APCD 2009), these control measures resulted in the area's attainment of the PM10 NAAQS, and EPA approved the re-designation request and maintenance plan for the Pagosa Springs area, which became effective on August 14, 2001. Even with the expected growth in PM10 emissions from categories including unpaved road dust, the adopted maintenance plan expects that the current control measures should ensure continued maintenance of the PM10 NAAQS through the year 2021, which is the duration of the maintenance period.

Between 1998 and 2008, the Pagosa Springs air quality monitor recorded only a single exceedance of the 24-hour PM10 NAAQS. However, in 2009, a total of four exceedances were recorded and in 2010, a total of five exceedances were recorded. The Colorado Air Pollution Control Division believes that all of these exceedances can be considered "exceptional events" as these were caused by regional high wind and blowing dust events. In 2011 and 2012 there were no reported exceedances of the 24-Hour PM10 NAAQS.

Environmental Consequences

All Alternatives

The primary management activities with potential to affect air quality within the Monument are oil and gas development, prescribed burning, motorized vehicle use associated with Monument visitation, and construction of visitor facilities and trails associated with Alternatives B and C. The impacts of oil and gas development are analyzed in detail in Section 3.12 of the LRMP. This assessment tiers to that analysis. The other management activities listed are expected to result in minor and/or short duration impacts to air quality. Potential smoke impacts from prescribed burning would be analyzed at the project level. Prescribed burning must comply with all applicable air quality standards and with burn permits issued by the State of Colorado.

Cumulative Impacts

Past and present actions such as prescribed burning and motorized vehicle use associated with Monument visitation have had negligible cumulative impacts on air quality. Past and present actions with air quality effects would have been detected in the regional air quality monitoring data collected in Pagosa Springs. As the monitoring data has shown, with the exception of the high wind events recorded in 2009 and 2010, air quality in the Pagosa Springs area is currently meeting the NAAQS, so past and present actions would not have contributed substantially to regional air quality impacts.

Reasonably foreseeable future activities that could have an impact on air quality include oil and gas development on the valid existing lease within the Monument, prescribed burning, ongoing road maintenance, new trail construction and maintenance, and increased motorized vehicle use associated with Monument visitation. Of these activities, oil and gas development and prescribed burning would have the greatest potential impact on regional air quality. Ongoing road and trail maintenance and motorized use associated with increased visitation to the Monument would have negligible to minor cumulative air quality impacts. Air quality impacts from these activities would be localized and would not be expected to have a measurable impact on regional air quality.

3.8 Scenery and the Auditory Environment

Affected Environment

The scenic vistas, night sky, and auditory environments are important objects of the Chimney Rock National Monument that draw tribal members, visitors, and researchers to the site. The Monument possesses outstanding and diverse scenery as well as unique and significant archaeoastronomical alignments which are dependent on undisturbed views of the horizon and night sky from numerous points within the Monument. These sites and the associated landscape, viewshed, and night sky have significant traditional values for

several tribes. As a culturally significant and publically interpreted site, the auditory environment of the Monument is also an important part of both the tribal member's and visitor's experience.

On NFS lands, the Scenery Management System (SMS) is used to manage scenery resources. The SMS gathers existing information and makes existing determinations and arrives at levels of scenic integrity. Through the NEPA process one level of scenic integrity is chosen for each unique area and these become scenic integrity objectives (SIOs). Under the current LRMP, the SIO for the Monument is high in the main Chimney Rock area and those areas along Peterson Ridge that are visible from US 160, and low for the rest of the Peterson Ridge area. Under Alternatives B and C, the SIO will be changed to high for the entire Monument.

Stages and terms of the SMS that are pertinent to the Chimney Rock National Monument are described below:

The *Ecologic Region* is M331 Southern Rocky Mountain Steppe – Open Woodland – Coniferous Forest – Alpine Meadow Province and M331G Mountain & Valley Plains South Central Highlands Section.

Landscape character is defined as the particular attributes, qualities and traits of a landscape that give it an image and make it identifiable or unique (USDA Forest Service, 1995). The desired landscape character in the Monument is a 'natural-appearing' landscape. It is a classic southwestern landscape with ponderosa pine, meadows, and rock outcrops. Pinyon, ponderosa pine, juniper, and Gambel oak are common. The north slopes are well-timbered with ponderosa pine and Douglas-fir. Grasses and shrubs dominate the meadows and the south slopes in the lower elevations of the east, south, and west sides of the Monument.

The term *scenic class* denotes the scenic attractiveness of an area. The Monument is predominately in scenic class 'B' (Common) with areas of scenic class 'A' (Distinctive) along the ridge which contains the Great House Pueblo and the spires of Chimney Rock and Companion Rock.

The *landscape visibility* is what one can see from where. The two main highways providing access to the area (US 160 and SH 151) provide mostly background views of the area with some middle ground and foreground views. The one major road interior to the Monument that accesses the major cultural areas and recreation sites and carries the majority of Monument traffic is NFSR 617. This road provides mostly middle ground and foreground views of the area. Visitors to the cultural sites themselves and archaeo-astronomical viewpoints have foreground, middleground and background views. Off road and off-trail travel is common in the area and those users have similar views. The high travel use on the surrounding highways and interior roads, interior landscape travel and the visually distinctive nature of the Chimney Rock area and its function as an archaeoastronomical site lead to a very high level of visual concern.

The Monument area's *community of interest* includes the users of the area – primarily surrounding tribal members, residents, business owners and recreationists. *Viewpoints of interest* include US 160 (including private land along the Piedra River), SH 151, the residential areas in Cabezon Canyon, NFSR 617, and along the ridge where the Great House, Great Kiva, and interpretive trails are located. The viewpoints of interest helped determine where key observation points (KOPs) should be located. These KOPs were used to help evaluate the impacts of proposed activities on the scenic resources of the Monument. A map showing the location of the KOPs and visual simulations of what can be seen from these points are included in Appendix C.

The *existing scenic integrity* is defined as the current state of the landscape, considering previous human alterations (USDA Forest Service, 1995). The surrounding valleys and areas that are not part of the National Monument have a general pastoral look to them along with some residential and commercial development. In the Monument itself, the landscape has not been visibly changed to a large degree from known past historical conditions and the existing scenic integrity is high.

The *visual absorption capability* of the landscape measures the ability of a landscape to accept alterations without a loss of scenic character. In the Monument, the variety and diversity of tree species and the presence of natural openings and rock outcrops make most areas of the landscape able to absorb changes; hence the high visual absorption capability in those areas. However, the northern portions of the area and the area surrounding the meadow on Peterson Ridge have a relatively continuous tree cover and a lower visual absorption capability; therefore changes may be obvious.

The *scenic stability* is defined as the ecological sustainability of the valued landscape character and its scenery attributes (USDA Forest Service, 1995. Fire was a dominant disturbance agent influencing vegetative structure and composition within the Monument prior to fire suppression. There have been recent efforts to manage vegetation through thinning and prescribed burning. However, suppression of fire through human intervention in other parts of the area has made the forest landscape denser with vegetation than would be the case if ecological processes such as fire were allowed to operate without human intervention. Many portions of the Monument could be thought of as having a higher degree of instability than would have occurred under the historic fire regime. That instability is most often equated with insects, diseases and fire that can dramatically change the landscape.

The auditory environment of the Monument is characterized by both natural and human-caused sounds. Natural sounds such as wind, birds, and insects predominate throughout most of the Monument. In the developed areas of the Monument, human-caused sounds are more common, particularly during the operating season. Human-caused sounds are generally intermittent, corresponding to tours and use along the major roads in and around the Monument, and include noises such as vehicle engines, doors closing, and voices.

Environmental Consequences

Under Alternative A, guidance for the management of scenic resources is set forth in the 2013 San Juan LRMP, with additional direction provided by the proclamation. Under Alternatives B and C, the Chimney Rock Management Plan supplements the LRMP guidance with desired conditions, objectives, and standards and guidelines specific to Chimney Rock National Monument, including guidance for auditory resources.

Alternative A (No Action)

Under Alternative A, impacts to scenic and auditory resources of the Monument from activities such as fuels treatments, prescribed burning, oil and gas development, livestock grazing, and recreation are expected to be similar to those described in the EIS for the LRMP. These activities all have the potential to impact the scenic and auditory resources of the Monument. Fuels treatments and prescribed burning can have short-term negative impacts to scenery due to the visibility of cut vegetation, slash, disturbed soil, and smoke, but will reduce the risk of long-term negative impacts from potential wildfires and fire suppression activities. Through fuels treatments and prescribed burning, the landscape will become less susceptible to catastrophic fire and hence the scenic stability will be enhanced. The LRMP provides numerous guidelines to help reduce the impact of fuels treatments and prescribed burning on scenic resources.

Development of the existing oil and gas lease within the Monument could include both short-term and long-term adverse impacts to the visual and auditory resources of the Monument. These impacts would be primarily associated with mineral extraction facilities such as oil and gas wells, pipelines, compressors, mining pits, ancillary structures and facilities, and access roads. The level of impacts would depend on what facilities are needed for development, where these facilities are located, and how long facilities are in place. Exploratory wells would have short-term, localized impacts with minimal facilities, whereas development associated with production would have long-term impacts and potentially multiple facilities. Any future development on the existing lease within the Monument would be permitted and managed in accordance with 36 CFR 228 and 251 regulations and 2013 LRMP guidance, keeping impacts to a "reasonable" level. "Reasonable" surface use is determined through NEPA analysis appropriate to the situation and implemented in compliance with stipulations, standard practices, applicable BMPs, guidelines for surface-disturbing activities, and applicable laws, standards, and policies, as well as with all USFS and BLM policies and regulations. If any development is proposed on the existing lease or for the development of reserved and outstanding (private) minerals in the future, site-specific environmental analysis appropriate to the situation will be completed at that time, and would include an assessment of impacts to the scenic and auditory resources in the Monument. It would also include consideration of the guidance in the proclamation that requires development of existing oil and gas leases within the Monument be managed so as not to create any new impacts that would interfere with the proper care and management of the objects protected by the proclamation.

Alternative A does not propose any new construction of recreational facilities, but it is anticipated that visitation to the Monument will continue to increase. Impacts to visual and auditory resources from recreation use under Alternative A would be localized and short-term, primarily associated with visitor use in the currently developed areas of the Monument. There could also be localized, short-term impacts from dispersed recreation use within the Monument, including dispersed camping. Impacts from livestock grazing are also expected to be localized and short-term because there is only a minimal amount of use by livestock in the Peterson Ridge area for a short season (approximately 30 days).

Overall, Alternative A would entail a minor to moderate adverse impact on the scenic and auditory resources of the Monument over the short-term and a negligible or minor beneficial impact over the long-term.

Alternative B

Under Alternative B, effects to the scenic and auditory resources of the Monument from fuels treatments, prescribed burning, and oil and gas development are expected to be similar to those described in Alternative A. However, the application of standards, and guidelines found in the Chimney Rock Management Plan would provide additional guidance and strategies designed to further minimize impacts from fuels treatments, prescribed burning, and oil and gas development. There will be no livestock grazing or dispersed camping allowed within the Monument under this alternative, so there will be no impacts to the scenic and auditory environment from these activities under this alternative.

Under Alternative B, additional visitor facilities, parking areas, and visitor shelters are proposed for construction within designated building envelopes (see Section 2.2 for a description of proposed facilities and Figure 5 for a map of the building envelopes). To help evaluate the impacts of the proposed improvements on the scenic resources of the Monument, visual simulations were prepared to determine if these improvements would be visible from the KOPs. These simulations are somewhat limited because

they are not able to depict vegetative cover which can help screen facilities from view, but they do give a general idea of how visible various improvements may be from different areas. The visual simulations are found in Appendix C.

Based on these visual simulations and field assessments of existing vegetative screening, it was determined that the improvements proposed for building envelopes 1 and 2 (visitor facilities and parking areas) would be most visible from specific locations on NFSR 617. They may also be visible from various points along State Highway 151 and the Cabezon Canyon Road, but existing vegetation will provide a considerable amount of screening and reduce visibility from most areas. The improvements proposed in building envelope 3 (visitor shelters) would be most visible from the ridgeline and existing interpretive trails (NFST 632 and 669) but will be compatible with improvements already present on those sites. The visitor shelters will not be visible from US 160, SH 151, or the Cabezon Canyon Road because of existing vegetative screening and geologic features. The improvements proposed in building envelope 4 (parking area) will be visible from SH 151 and the Cabezon Canyon Road. It may also be visible from the ridgeline and existing interpretive trails in the upper area, but will blend with existing views of SH 151.

Under Alternative B, there would be additional short-term impacts to the auditory environment during construction of visitor facilities, parking areas, and trails as compared to Alternative A. In addition, impacts to scenic and auditory resources would occur over a longer period of time since the maximum operating season may be extended by approximately 1½ months as compared to Alternative A.

The adoption of the Chimney Rock Management Plan will supplement direction found in the LRMP, minimizing impacts to the scenic and auditory resources in the Monument. This supplemental direction includes requirements that new facilities and associated development be located in areas where they will not detract from views of Chimney Rock, Companion Rock, or other significant cultural features or viewsheds within the Monument, and that new facilities be designed to be consistent with the character of the site as per the Built Environment Image Guide (BEIG) and any site-specific BEIG direction. It also requires activities that occur within the Monument be conducted in a manner that limits visual, auditory, and night sky impacts and that permanent lighting within the Monument be minimized in order to preserve views of the night sky.

Overall, Alternative B would entail a minor adverse impact on the scenic and auditory resources of the Monument over the short-term and a moderate beneficial impact over the long term.

Alternative C

Under Alternative C, effects to the scenic and auditory resources of the Monument from fuels treatments, prescribed burning, oil and gas development, and livestock grazing are expected to be similar to those described in Alternative A. Impacts from recreation use and the development of new facilities will be similar to those described under Alternative B. However, there is the potential for more visitors to the Monument compared to Alternatives A or B, potentially increasing impacts to scenic and auditory resources. In addition, the maximum operating season may be approximately 2 months longer compared to Alternative B and 3½ months longer compared to Alternative A. This extends the amount of time that scenic and auditory resources could be impacted.

Overall, Alternative C would have minor adverse impacts on the scenic and auditory resources of the Monument over the short-term and a minor beneficial impact over the long term.

Cumulative Impacts

There are numerous past activities that have impacted the scenic and auditory resources in the Chimney Rock area including the construction of roads and trails that provided more access to the site, visitation to the site, coal mining, and development of adjacent private land. Current activities that impact the scenic and auditory resources of the Monument include visitation to the site, traffic along SH 151 and US 160, fuels treatments, and prescribed burning. Foreseeable future activities may include continued increases in visitation levels to the Monument, increases in traffic volume along SH 151 an US 160, additional changes to facilities, the construction of additional trails, continued development of private lands near the Monument, ongoing fuels treatments and prescribed burning, and potential development on the existing mineral lease and the reserved and outstanding (private) minerals within the Monument. The combination of past, present, or foreseeable future activities in and around the Monument would result in minor to moderate adverse cumulative effects to the scenic and auditory resources of the Monument.

3.9 Terrestrial and Riparian Ecosystems

Affected Environment

The terrestrial and riparian ecosystems (TRE) of the Chimney Rock National Monument provided the Ancestral Puebloans with many of the materials they needed to survive and thrive in their environment, including food, fuel, shelter, and habitat for wildlife. Today, the TRE of the Monument continues to provide traditional cultural materials that are collected by tribal members for food and medicine, habitat for a variety of wildlife species, and are an important part of the scenic vistas that draw people to the area.

The primary vegetation cover types within the Monument are ponderosa pine, followed by pinyon-juniper, mountain shrublands, warm-dry mixed conifer, and grasslands. These cover types make up approximately 93% of the Monument area. There are also riparian areas associated with the Piedra River, Stollsteimer Creek, Peterson Gulch, and intermittent drainages, as well as bare shale slopes and exposed sandstone associated with the steepest ground. Important traditional cultural materials may be found in all of these cover types. Table 13 provides acreages of each cover type within the Monument. Existing cover types are also displayed in Figure 10. More detailed descriptions of these cover types can be found in Section 3.2 of the LRMP.

The variability in terrain within the Monument fosters this diversity of vegetation, with geology, soils, aspect, and elevation determining what species dominate. Ponderosa pine is occasionally found at higher elevations (where soil depth is adequate for retaining soil moisture) as individuals or scattered patches, mixed with patches of pinyon-juniper and shrublands. Douglas-fir dominated warm-dry mixed conifer occurs on generally steep northwest to northeast-facing slopes of escarpments or canyons into the drainage bottoms. Ponderosa pine with an understory of Gambel oak and other shrubs dominates the gentler terrain of rolling foothills surrounding the cuesta rims. At the highest elevations on west to southeast aspects in both the Peterson Ridge and Chimney Rock areas, pinyon-juniper is more abundant than ponderosa pine. These exposed sites are more conducive to the more drought-resistant pinyon-juniper and associated species due to high evaporative loss and lack of moisture-retaining soil.

Figure 10: Cover Types within the Monument

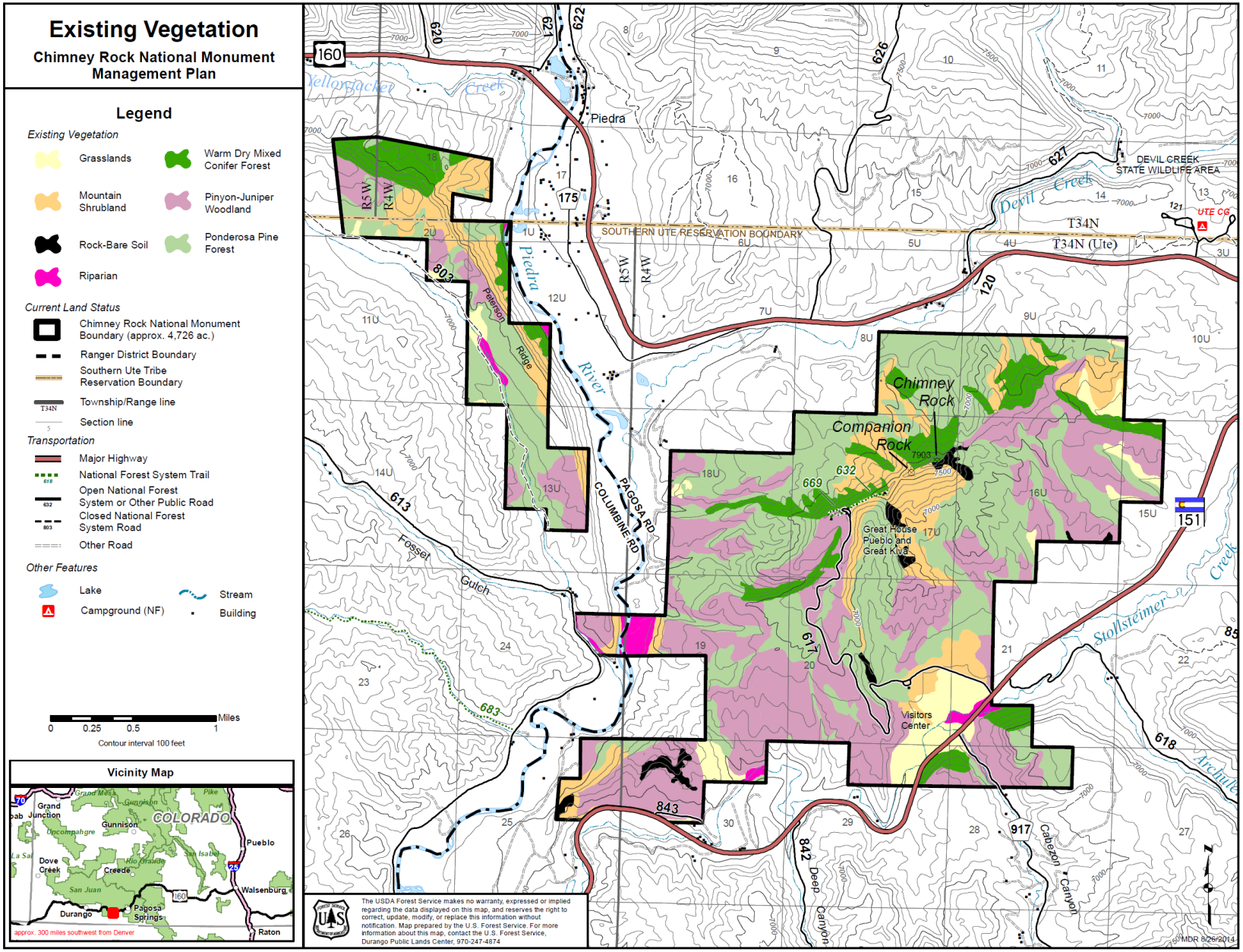


Table 13: Cover Types within the Monument

Cover Type	Acres	% of Monument Area
ponderosa pine	1752	37
pinyon-juniper	1587	34
mountain shrublands	613	13
warm-dry mixed conifer	412	9
grasslands	234	5
riparian/water	70	1
barren rock/soil	58	1

Mountain shrublands are found along the prominent ridgelines surrounding Chimney Rock, on the lower and mid slopes on the west side of Chimney Rock above the Piedra River, and on the slopes east of Peterson Ridge. These areas are dominated by mountain mahogany, bitterbrush, and serviceberry, with Gambel oak and occasional pinyon and juniper scattered throughout. Shrublands are also found on the rolling hills and flats near the entrance to the Monument where Gambel oak is the dominate shrub on the middle and lower slopes. Big sage is only a minor component in the mountain shrublands, being found mostly in the flats near the entrance, and occasionally on the upper mesa along NFSR 617.

Grasslands can be found on the gentler ground near Stollsteimer Creek, Peterson Gulch, and scattered along the southern and eastern boundaries of the Monument. These areas are dominated by a mixture of native and non-native grasses, such as blue grama, galleta, needle grass, Indian rice grass, and wheatgrasses. Shrubs such as big sage and rabbitbrush are interspersed in these grasslands. Many of the non-native grasses such as crested wheatgrass were seeded into the area in the 1970's in and attempt to improve forage for livestock, deer, and elk.

Riparian areas are found associated with the Piedra River, Stollsteimer Creek, and Peterson Gulch. The section of the Piedra passing through the Monument has a robust riparian corridor dominated by cottonwoods and several species of willows. The riparian area on Stollsteimer Creek shows evidence of historic over grazing, flow alteration from upstream diversions, and road related impacts. Lack of recent grazing has resulted in some evidence of riparian recovery and early seral riparian species such as coyote willow are reestablishing. The riparian area surrounding the spring development and stock pond on Peterson Ridge is dominated by cottonwoods and willows.

A variety of noxious weeds are present in the Monument. Noxious weeds are defined as non-native plants that disrupt native vegetation and ecosystems. The State of Colorado categorizes noxious weeds into three lists: A, B, and C. List A plants are designated for elimination on all county, state, federal and private lands. List B includes plants whose continued spread should be stopped. List C plants are selected for recommended control methods (Colorado Weed Management Association, 2013).

There are currently no List A noxious weed species found within the Monument. List B species within the Monument or on lands in close proximity to the Monument include Canada thistle (*Cirsium arvense*), Musk thistle (*Carduus nutans*), bull thistle (*Cirsium vulgare*), Scotch thistle (*Onopordum acanthium*), and

hoary cress (*Cardaria draba*). List C noxious weeds found within or close to the Monument include common downy brome (*Bromus tectorum*), redstem filaree (*Erodium cicutarium*), Mullein (*Verbascum thapsus*), and field bindweed (*Convolvulus arvensis*). Canada thistle, musk thistle, downy brome, and redstem filaree are the most common noxious weeds found within the Monument. The Forest Service has and will continue to monitor and treat noxious weeds within the Monument on a limited basis, in compliance with the Invasive Species Action Plan for the SJNF (2007).

Historical Vegetative Conditions

In order to better understand and evaluate current conditions within the Monument, it can be helpful to look at historic vegetation conditions. Information regarding historic vegetative conditions comes from several sources, including specific tree ring dating studies carried out at Chimney Rock, soil pollen studies, fire histories studies from similar forest types on the Pagosa District, and other historic records such as botanical inventories and rangeland analysis records.

Tree-ring dating studies carried out in the Chimney Rock area in 1989 produced some general age information for the various forest cover types found within the Monument. At that time, warm-dry mixed conifer on northern slopes ranged from 80-100 years old, ponderosa pine on southern aspects from 200-250 years old, and pinyon-juniper from 100-400+ years old. A dead juniper on the Great House Trail was dated to over 600 years in age. A stand of ponderosa about 1½ miles northwest of Chimney Rock contained trees of over 350 years in age (SJNF 1992). Soil pollen studies indicate that prior to AD 900, forest cover of the Chimney Rock mesa was dominantly ponderosa pine and cooler-climate conifers, and was converted to the present pinyon-juniper around the time of occupation of the site [AD 900-1125], either through human-caused deforestation or by natural climatic change (SJNF 1992). These effects, perhaps in combination with early 20th-century logging activities (Schmoll 1935), may help to explain the relatively young ages of ponderosa pine and mixed conifer stands in the Chimney Rock area.

Like most lower-elevation forest cover types on the SJNF, fire was a dominant disturbance agent influencing vegetative structure and composition. Comprehensive fire-scar histories for the Pagosa Ranger District and SJNF indicate frequent, low-intensity fires occurring in ponderosa pine and warm-dry mixed conifer vegetative types prior to Euro-American settlement around 1870. Ponderosa pine typically burned on a 10-15 year cycle; warm-dry mixed conifer on a 15-25 year cycle. Following settlement by people of primarily European origins in the late 1800's – accompanied by high numbers of livestock, particularly sheep (late 1800's through the early 1900's) and, later, cattle (early 1900's) – a period of fire exclusion began across the bulk of these low-elevation forests which has continued to this day. The combined effects of heavy grazing, climate cycles, timber harvesting, and fire suppression have resulted in a dramatic reduction in fire on the landscape, leading to overly dense stands of ponderosa pine and warm-dry mixed conifer susceptible to high intensity wildfire, and at high risk for bark beetle attack. Also, though pinyon-juniper functions under a different fire regime (normally stand-replacement, when fuel, climate/weather, and fire ignition come together), many pinyon-juniper stands, including some within the Monument, are susceptible to stand-replacement fire. More detailed discussions regarding the historic range of variability and the role of disturbance can be found in Section 3.2 of the LRMP.

Livestock grazing and wildlife management within the Monument has influenced the composition of grasslands, both directly through grazing, and indirectly through seeding of non-native grasses with the intention of increasing available forage. Livestock grazing has also impacted riparian areas within the

Monument, and, in combination with increasing amounts of recreation use, has contributed to the spread of noxious weeds in the Monument.

Recent and Ongoing Management Activities

Prior to its designation as a national monument, the Pagosa RD completed several projects in the Chimney Rock area designed to address the elevated risk for wildfire and increasing bark beetle attacks in the area. In 2003-2005, spraying of bark beetle repellent chemicals was conducted on pinyon pines near the Great Kiva and other adjacent ruins and also on ponderosa pines near the visitor center. Thinning of mostly Rocky Mountain juniper and small ponderosa pine was also conducted near the visitor center and in several patches of ponderosa pine on either side of NFSR 617. Approximately 45 acres were treated during this period to help address various forest health concerns.

In 2009, thinning, mowing, and shredding of ponderosa pine, Douglas-fir, white fir, juniper, and Gambel oak and other shrubs was completed across approximately 414 acres within the Monument as part of the Stollsteimer Fuels Reduction and Restoration project. The bulk of this work occurred on either side of southeast-trending draws along the southeast edge of the Monument (near SH 151); two other units were north and west of the Chimney Rock crest (near US 160). In 2010, an additional 120 acres of ponderosa pine, pinyon pine, and juniper were hand-thinned and piled in the area west of NFSR 617. Prescribed burning was conducted as a follow up to the thinning, mowing, and shredding that was done as part of the above projects.

Between 2011 and 2014, approximately 280 acres were broadcast burned. Most of this burning occurred around the visitor center and on the slopes south of Chimney Rock and Companion Rock, with some burning also occurring about halfway up NFSR 617. Piles were also burned on an additional 207 acres near the visitor center and adjacent to the upper parking lot between 2006 and 2011.

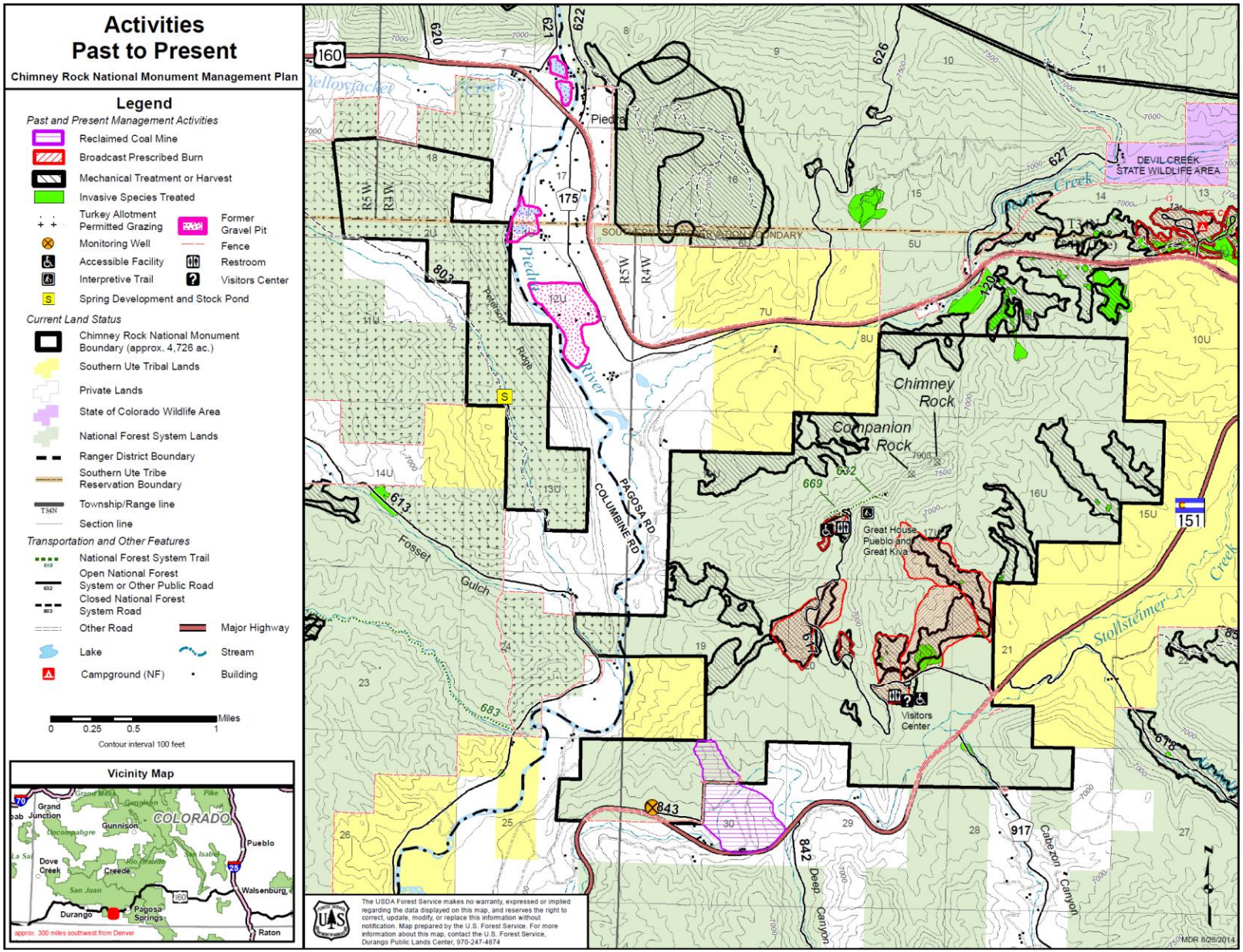
There have also been other fuels reduction/forest health projects close to or immediately adjacent to the Monument on NFS lands. These projects include the 2006 Ute Fuels Reduction and Restoration project, which is near the northernmost boundary of the Monument, near the Chimney Rock store and Ute Campground, and the 2008 Vega La Juana Fuels Reduction and Restoration project east and south of Capote Lake. Fuels reduction treatments have also been conducted by the BIA on Southern Ute Indian Reservation lands immediately adjacent to the northern boundary of the Monument and on nearby areas south of the Monument. The BIA also has additional treatments planned north of the Monument in the next several years.

Collectively, the above recent fuels reduction and forest restoration treatments have substantially reduced fuel loading and connectivity, thereby greatly reducing the threat of stand-replacement fire in the Chimney Rock area. Similar activities have not taken place in the Peterson Ridge area, largely due to lack of effective access.

Special Status Plant Species

Aztec milkvetch (*Astragalus proximus*) is the only Forest Service sensitive plant species know to occur within the Monument. It is a local endemic found only within the San Juan Basin in southwestern Colorado and northwestern New Mexico. It is fairly common in New Mexico, but is much rarer in Colorado (Decker, 2005). There are also two sensitive plant species that have never been found within the Monument, but that have suitable habitat in the Monument. These are Missouri milkvetch (*Astragalus missouriensis* var. *humistratus*) and frosty bladderpod (*Lesquerella pruinosa*). There are no known threatened or endangered plant species in the Monument.

Figure 11: Past and Present Activities within the Monument



The other plant species of particular interest within the Monument is a type of cholla cactus found infrequently near the upper parking lot and elsewhere within the Monument. It has been theorized that this species was intentionally cultivated by the Ancestral Puebloans.

Environmental Consequences

The primary management activities with potential to affect TRE within the Monument are mechanical fuels treatments, prescribed burning, recreation use, livestock grazing, and oil and gas development. Guidance included in the LRMP, including desired conditions, objectives, standards, and guidelines will apply to all alternatives analyzed. Additional guidance provided in the Chimney Rock Management Plan will apply to Alternatives B and C, and is expected to further minimize adverse impacts to TRE within the Monument. Under all alternatives, noxious weeds would continue to be inventoried and treated according to the LRMP and Invasive Species Action Plan (SJNF 2013).

Alternative A (No Action)

Under Alternative A, effects to TRE from mechanical fuels treatments, prescribed burning, and potential oil and gas development within the Monument are expected to be similar to those described in the EIS for the LRMP. Recreation use and related impacts are expected to gradually increase at the Monument. These impacts include additional trampling of ground vegetation, displacement of ground cover, and compaction and/or erosion of soils. This can, in turn, increase the potential for introduction and spread of noxious weeds. These impacts will generally be confined to developed areas such as roads, parking areas, and trails, but can also occur in areas directly adjacent to these sites. Under Alternative A, these impacts will occur during the current May 15 – September 30 maximum operating season. There have been no visitor-related impacts to riparian areas noted within the Monument.

The collection of forest products and/or plant material by tribal members for traditional purposes will continue under this alternative. Mechanical fuels treatments and prescribed burning in mountain shrublands, ponderosa pine, and pinyon stands may have localized impacts on some of the species used for these purposes, such as sumac and pinyon.

Impacts from livestock grazing are dependent on many factors, including timing, frequency, duration, and intensity of grazing. Impacts can include trampling of plants, direct removal of plant material through grazing, and impacts to the litter layer and soil. Invasive plant species can also be introduced or spread by grazing. These impacts can occur in both terrestrial ecosystems and riparian areas. The proclamation requires protection and proper care and management of the objects of the Monument, including biological features such as the TRE of the Monument. Currently, due to the limited availability of water and relative inaccessibility, the Peterson Ridge area has not been used much by cattle in recent years, so impacts from grazing have been minimal. On the Turkey Allotment, an adaptive management system is in use which relies on monitoring information to determine if management changes are needed, and if so, what changes, and to what degree. Under Alternative A, the impacts of grazing would be monitored to determine what impacts livestock are having on the objects of the Monument, including biological features. If unacceptable impacts are identified, then management actions will be taken to eliminate or mitigate impacts to these objects.

Recreation use, livestock grazing, mechanical fuels treatments, prescribed burning, and potential oil and gas development may also impact sensitive plant species and habitat within the Monument. Impacts to

these species are expected to be similar to those described in the LRMP and LRMP Biological Evaluation (BE). Impacts from management actions will be minimized by implementing the standard from the LRMP requiring that projects or activities occurring on shale and gypsum soils occupied by sensitive plant species be designed to maintain the soil characteristics necessary to support and sustain those sensitive plant species. There will be no effect to federally listed plant species since none are known or suspected to occur in the Monument, and there is no habitat for any federally listed plant species within the Monument.

Alternative B

Under Alternative B, effects to TRE from mechanical fuels treatments, prescribed burning, and potential oil and gas development are expected to be similar to Alternative A, but with an added emphasis on fuels reduction activities on the slopes near archeological resources to help reduce risk to these resources from wildfire. Alternative B also provides increased visitor services, as compared to Alternative A. Up to 1¾ acres will be cleared for visitor facilities and additional parking, and up to 1 mile of new trails may be constructed. In addition, the maximum operating season will increase by approximately 1½ months. The availability of additional facilities and longer operating season will likely increase the number of visitors at the site each year as compared to Alternative A. All of these factors could lead to more ground disturbance and an increase in the potential for introduction and spread of noxious weeds as compared to Alternative A.

The portion of the Turkey Allotment within the Monument will be closed under this alternative. With the closing of the Turkey Allotment, impacts by livestock would be eliminated, thus eliminating the need to monitor the impacts of livestock.

Impacts to forest products and/or plant material collected by tribal members for traditional purposes will be minimized under Alternative B with the application of standards in the Chimney Rock Management Plan that require projects be designed or modified so that negative impacts to areas with high value for traditional/spiritual uses, and food and medicine gathering uses are avoided or mitigated.

Impacts to special status plant species known to occur in the Monument, or with habitat in the Monument, will be similar to those discussed under Alternative A.

Alternative C

Under Alternative C, effects to TRE from mechanical fuels treatments, prescribed burning, and potential oil and gas development are expected to be similar to Alternative B. Alternative C provides more visitor services than Alternatives A or B. Up to 2.75 acres will be cleared for visitor facilities and additional parking and up to 2 miles of new trails may be constructed. In addition, the maximum operating season will increase by approximately 2.5 months. The availability of additional facilities and longer operating season will likely increase the number of visitors at the site each year as compared to Alternatives A or B. All of these factors could lead to more ground disturbance and an increase in the potential for introduction and spread of noxious weeds as compared to Alternatives A or B.

The Turkey Allotment will remain open under this alternative. Use by cattle is expected to remain light due to the limited availability of water and relative inaccessibility, so impacts from grazing are expected to remain minimal. In addition to the direction found in the proclamation that requires the protection of the objects of the Monument, the Chimney Rock Management Plan will also be adopted under this

alternative. Because of the added direction and additional monitoring requirement provided by the management plan, there is even less potential for negative impacts from livestock grazing under this alternative as compared to Alternative A.

Impacts to special status plant species known to occur in the Monument, or with habitat in the Monument, will be similar to those discussed under Alternative A.

Cumulative Impacts

There are numerous past activities that have impacted the TRE in the Chimney Rock area including fire suppression, livestock grazing, fuels treatments, prescribed burning, and developed and dispersed recreation use. Current activities that impact the TRE of the Monument include livestock grazing, grazing by trespass horses, ongoing fuels treatments and prescribed burning, increasing amounts of visitation to the site, and ongoing drought. Foreseeable future activities may include continued permitted livestock grazing, fuels treatments, prescribed burning, increasing amounts of visitation to the site, the construction of additional facilities and trails, climate change, and the potential development of the existing mineral lease or the reserved and outstanding (private) minerals within the Monument. The implementation of this action combined with past, present, or foreseeable future activities in or around the Monument, would result in minor cumulative effects to the TRE of the Monument.

3.10 Water Resources and Soils

Affected Environment

The Chimney Rock National Monument occupies portions of five 6th level watersheds within the Piedra River sub-basin (Table 14). The two perennial streams within the Monument are the Piedra River and Stollsteimer Creek. The Piedra River passes through a ¼ mile section of the western portion of the Monument, flowing from north to south. This section of the Piedra has a robust riparian corridor, and contains one ditch heading that diverts water to adjacent private lands. Stollsteimer Creek crosses the southern boundary of the Monument in two places totaling approximately 1.1 miles. Much of the riparian corridor along Stollsteimer Creek shows evidence of historic over grazing. Stollsteimer also shows evidence of flow alteration from upstream diversions, and road related impacts associated with SH 151. The Monument also contains numerous intermittent and ephemeral streams. The northwest flowing tributaries terminate primarily in Devil Creek, while those flowing southeast join Stollsteimer Creek. Both Devil and Stollsteimer Creeks join the Piedra River near the Monument boundary. There is also one developed spring and associated stock pond within the Monument located on Peterson Ridge (Figure 7).

Soils within the Monument are derived primarily from weathered sedimentary or modern alluvium parent material. Over 75% of the Monument surface area has an erosion hazard rating of severe or very severe, and natural (non-anthropogenic) erosion processes are evident throughout the Monument. This tendency towards natural erosion has been accelerated in some areas by past and current management activities, particularly grazing and road construction.

Table 14: 6th Level Watersheds within the Monument

HUC 6	Watershed Name
140801020302	Outlet Devil Creek
140801020404	Cabezon Canyon – Stollsteimer Creek
140801020405	Outlet Stollsteimer Creek
140801020501	Yellowjacket Creek – Piedra River
140801020502	Bull Creek – Piedra River

Environmental Consequences

Guidance for the management of watershed and soil resources is set forth in the 2013 San Juan LRMP; the Chimney Rock Management Plan supplements this guidance with desired conditions and objectives specific to the watershed and soil resources of Monument. Under Alternative A the Monument will be managed in accordance with the 2013 LRMP and the proclamation. Alternative B and C will utilize direction found in the Chimney Rock Management Plan, the proclamation, and the 2013 LRMP.

Alternative A (No Action)

Under Alternative A, existing impacts to watershed and soil resources are expected to continue in their current scope and intensity. The majority of impacts are associated with the existing road and trail network, and historic grazing practices. Watershed and soil impacts associated with historic grazing are concentrated along Stollsteimer Creek in the south eastern portion of the Monument. Along this reach of Stollsteimer Creek the riparian area shows evidence of past overgrazing that has resulted in sections of bare and eroding bank, as well as vertical and lateral instability. Lack of recent grazing has resulted in some evidence of riparian recovery and the establishment of early seral riparian species, dominated by coyote willow. These impacts have exacerbated alterations in the flow regime of Stollsteimer Creek as a result of upstream diversions.

The existing road and trail network has resulted in accelerated rates of erosion in isolated areas, particularly in the vicinity of intermittent and ephemeral drainage crossings. However, the impacts of this erosion are not significant as the majority of material is trapped near its origin, and there is no evidence of transport to surrounding water bodies. Other recent management activities within the Monument boundary, such as fuels reduction and prescribed fire, have resulted in positive changes in watershed conditions via restoring the natural fire regime. Currently, due to the limited availability of water and relative inaccessibility, the Peterson Ridge area has not been used much by cattle in recent years, so grazing impacts on water resources and soils has been minimal.

Alternative B:

The outcomes of Alternative B will be similar to those of Alternative A, with some additional impacts associated with construction of additional facilities as described in Section 2.2. The construction of an additional 1 mile of interpretive trail within the Monument would likely result in very minor increased erosion during and immediately after trail construction. Short- and long-term erosion issues from trails

would be successfully mitigated by following the guidance specified in FSH 2309.18 Trails Management Handbook and the USDA Trail Construction and Maintenance Notebook.

Construction activities associated with facility development in building envelopes 1, 2, 3, and 4 would likely generate localized short-term impacts on watershed and soil resources associated with ground disturbing activities. The impacts would primarily be erosion and soil compaction, which would be effectively mitigated via the application of the management measures contained in FSH 2509.25. Long term impacts to soils and watershed would be very minimal, as the proposed developments generally occur in areas of low or no slope, would not impact stream courses, and represent small fractions of much larger watersheds. With the closing of the Turkey Allotment under this alternative, impacts by livestock would be eliminated, as compared to Alternatives A or C.

The stream assessment and restoration objectives specified in the Chimney Rock Management Plan would contribute to improved riparian health and stream stability on Stollsteimer Creek relative to Alternative A.

Alternative C:

The types of impacts associated with Alternative C would be identical to those described under Alternative B; however they would be marginally greater in scope and intensity due to the larger foot print of the developments described in Section 2.2. The larger scope of development in Alternative C would likely also result in increased visitor traffic and marginally increasing levels of erosion along the transportation network. These impacts would be successfully mitigated using the same methodologies described under Alternative B. Use by cattle is expected to remain light due to the continued limited availability of water and relative inaccessibility, so impacts from grazing are expected to remain minimal.

Cumulative Impacts

Past and present actions such as livestock grazing, upstream diversions, road related impacts, and impacts from visitation have had impacts on the water and soil resource. Reasonably foreseeable future activities that could have an impact on the water and soil resource include oil and gas development on the existing lease within the Monument, ongoing road related impacts, new trail construction and maintenance, and increased use associated with Monument visitation. The combination of these past, present, and foreseeable future activities would have a negligible to minor cumulative impact on the water and soil resource.

3.11 Terrestrial Wildlife and Fisheries

Affected Environment

The broad range of vegetation types, and key habitat features and components across the Monument provide habitat for a broad range of terrestrial and aquatic species. Given the diversity of habitats, it is not possible to evaluate the effects from management actions to all species or populations potentially occurring in the Monument. For this reason, management actions and corresponding effects to terrestrial and aquatic species are assessed by addressing larger groups of species that share commonalities on how they respond to habitat conditions and management actions, or are species with management emphasis as described in the LRMP (USDA Forest Service 2013a). This section addresses the following groups of

terrestrial and aquatic species: Management Indicator Species (MIS), migratory birds, Forest Service sensitive species, and federally listed species.

Habitat for terrestrial and aquatic species in the Monument is variable as determined by vegetation, topography, soil, aspect, elevation, and presence of water. Dominant vegetation types include mountain grasslands, mountain shrublands, pinyon-juniper, ponderosa pine/Gambel oak and warm-dry mixed conifer forests. The spatial distribution of vegetation is determined by topography, soil, aspect, and elevation. Vegetation types and current composition and structural characteristics are described in the terrestrial and riparian ecosystems section. Habitat for species is also dependent on the physical and biological components such as the presence of key habitat features (rock outcrops and cliffs) and key habitat components (snags and downed logs), and presence of water. Perennial water sources are limited to the Piedra River and Stollsteimer Creek, and intermittent water sources are limited to Peterson Gulch. Ephemeral water sources are associated with drainages or low lying areas that pool water during moisture events. There is also one spring development and pond present on Peterson Ridge, and a wildlife guzzler south of State Highway 151 east of the Cabezon Canyon Road.

Primary human influences to terrestrial and aquatic species in the Monument include historic timber harvest, domestic livestock grazing, wildfire suppression, summer and winter recreation, and mechanical vegetation treatments which have historically emphasized forest restoration and wildlife habitat improvement. These activities have influenced vegetation structure and composition affecting foraging, breeding, and security habitat for terrestrial species.

Disturbance to terrestrial species from motorized and non-motorized use across the Monument varies by season and activity. The entire Monument receives minimal use during spring and summer (except in developed areas during the guided tour season), with use increasing during the fall big game hunting seasons. Access across the Monument is mostly limited to non-motorized travel, with some areas offering easier access than others. The Peterson Ridge area is difficult to access due to adjacent private land boundaries on the north, east, and southeast portions. Access to Peterson Ridge from the south and west is feasible via foot over dense vegetation and steep terrain. Non-motorized access elsewhere in the Monument is generally good with access points off U.S. Highway 160 and State Highway 151.

Motorized travel from late spring through summer is mostly limited to the Chimney Rock Road (NFSR617), which provides access to the lower parking area/visitor cabin, and upper parking area for guided tours. Year-round motorized travel occurs on a short section of the Cabezon Canyon Road (CR 917) near the eastern boundary. Non-motorized spring and summer travel is limited in the area surrounding Chimney Rock and Companion Rock due to current Forest Order (SJ-99-02) that prohibits public entry within ½ mile radius around the spires from March 1 through September 30 to minimize disturbance to peregrine falcon during breeding season. Exceptions to the order include the upper parking lot and ruins area. Outside the ½ mile radius closure, non-motorized public use from spring through summer is considered low. Common spring activities in the Monument include day hiking, wildlife observation and sightseeing, turkey hunting, antler shed collection. The same activities occur to a lesser extent in the Peterson Ridge area due to difficult access.

Motorized winter travel is prohibited across the entire area, excluding the short section of Cabezon Canyon Road. Non-motorized winter travel from day hikers, snowshoers, and cross-country skiers occurs on the Chimney Rock Road and to a lesser extent in areas adjacent to or away from the road.

Despite historic and current management activities and human disturbances in the area, the Monument continues to provide seasonal and/or year-round habitat for a diverse compliment of terrestrial and aquatic species. Although management activities have influenced habitat for species to some degree, habitat remains fully capable of supporting the biological requirements (foraging, breeding, etc.) for many species. Additionally, use levels and associated human disturbance are well established, and do not appear to be adversely impacting species use or movement patterns in the Monument.

Species carried forward for analysis and total available habitat in the Monument are summarized below and in Table 15.

Management Indicator Species

Management Indicator Species (MIS) are evaluated because their population changes or trends are believed to indicate the effects of management activities on other terrestrial and aquatic populations as a whole. MIS with habitat present in the Monument include Abert's squirrel, hairy woodpecker, elk, brown trout, and rainbow trout. These MIS have either been observed or reported in the Monument occupying habitat year-round. MIS are not species at risk or trending towards federal protection, and all have habitat that is well distributed across the Forest. Habitats utilized, season of use, total available habitat in the Monument, and Forest-wide habitat and population trends are described in Table 15. More detailed information concerning habitat, status and distribution across the Forest, and risk factors can be found in the LRMP.

Abert's squirrels are dependent on ponderosa pine forests for nesting, foraging, and cover. Hairy woodpeckers feed on bark beetles and other insects living in dead and dying trees, and nest in tree cavities in ponderosa pine, aspen and mixed conifer forests. Although small resident herds of elk exist in and surrounding the Monument, most elk use occurs from fall through spring. Elk generally begin migrating into the area late fall/early winter and remain in the area through spring. The Monument provides one of the largest blocks of non-motorized, undeveloped severe winter range areas for elk along U.S. highway 160 from Pagosa Springs to Yellow Jacket Pass. The Colorado Parks and Wildlife (CPW) has identified most of the Monument (93% of the area) as severe winter range for elk due to the extensive use during winter. Elk are commonly hunted during the big game hunting seasons and provide watchable wildlife opportunities during winter.

Approximately 0.7 miles of the Piedra River flows through the western portion of the Monument, and contains populations of brown and rainbow trout, non-endemic cutthroat trout, and other fish species such as mottled sculpin. Fish habitat in the Piedra portion of the Monument is low gradient with mostly riffle and glide areas present. Despite low flows from late summer through winter, and diversions present upstream that divert water for agricultural use, the Piedra River continues to retain much of its natural hydrograph for sustaining fish habitat and populations year-round.

Approximately 1.1 miles of Stollsteimer Creek flows through eastern and southern portions of the Monument. Stollsteimer Creek is a tributary to the Piedra River. The portion of the creek that flows through the Monument is low gradient with minimal flows except during spring runoff. The combination of low flows during most of the year, and minimal habitat complexity provide limited habitat for fish. The presence of brown and rainbow trout in Stollsteimer Creek is primarily limited to short periods during high flows associated with spring runoff when fish move upstream from the Piedra River.

Table 15: Management Indicator Species with Habitat present in the Monument

MIS	Habitat of Concern	Primary Management Issue	Total Habitat Present in Monument	Forest-wide Habitat and Population Trend
Abert's squirrel	Ponderosa pine forest	Effects to species and habitat associated with timber harvest and fuels treatments	1,665	Stable
Elk	Severe winter range & winter concentration areas (pinyon-juniper woodlands, sagebrush shrublands, mountain shrublands, & ponderosa pine forests)	Effects to species and habitat associated with recreation, fuels treatments, oil and gas development, and timber harvest	Forage –3,034 Cover – 1,479 Winter range – Severe winter range – 4,377	Population – Stable Habitat - Downward
Hairy woodpecker	Ponderosa pine, aspen, and mixed conifer forests	Effects to species and habitat associated with timber harvest and fuels treatments	3,193	Population – Stable Habitat – Upward
Brown trout	Lentic and lotic habitats: water quantity, water quality, physical habitat features, invasive species disease	Effects to water quantity due to water depletions associated with reservoirs, diversions, and oil and gas development. Effects to water quality and water temperature due to soil erosion and sedimentation associated with ground-disturbing activities (fuels treatments, oil and gas development, timber harvest, livestock grazing, road construction, and recreation). Inadvertent exotic and invasive species introductions.	0.7 miles of Piedra River 1.1 miles of Stollsteimer Creek	Population – Downward Habitat - Downward

Migratory Birds

Migratory bird species evaluated are identified as candidates for conservation priority by the FWS in the Southern Rockies/Colorado Plateau Bird Conservation Region 16 (USDI Fish and Wildlife Service 2008), and the Colorado Partners in Flight Bird Conservation Plan for the Southern Rocky Mountains Physiographic Area 62 (Beidleman 2000). There are several migratory bird species on both lists that are also listed as Forest Service sensitive species or federally listed as threatened or endangered species by FWS. These species are discussed in the sensitive and federally listed species sections. Habitats utilized, season of use, and total available habitat in the Monument for migratory birds evaluated in this section are described in Table 16. More detailed information concerning habitat, status and distribution across the Forest, and risk factors can be found in the LRMP.

Species reviewed for this analysis are broken into analysis groups based on their restriction to, or strong representation within a particular habitat type. Broad-tailed hummingbird, green-tailed towhee, and Virginia's warbler are common breeding species present from spring through summer in the Monument's mountain shrubland habitats. Juniper titmouse and pinyon jay are year-round residents occasionally observed in pinyon-juniper woodlands. Lazuli bunting and MacGillivray's warbler are occasionally observed from spring through summer in riparian areas. Band-tailed pigeons (occasional user) and Grace's warbler (common breeder) are present from spring through summer preferring ponderosa pine

forests for foraging and nesting. Although dusky grouse have not been reported in the Monument, they have been observed in mixed conifer forests at the same elevation, and in the same habitats as those present in the Monument. Golden eagles and prairie falcons are year-round residents. Both species are associated with cliff/rock habitats for nesting and forage over open coniferous or deciduous forests, mountain grasslands, and shrublands. Eagles are observed more frequently than prairie falcons especially during fall and winter. Violet-green swallow is a common breeder that nests in natural tree cavities, or abandoned cavities constructed by woodpeckers, usually along forest edges or other open areas. Williamson's sapsucker is a common breeder, and a primary cavity nester that constructs cavities in aspen or conifers.

Table 16: Migratory Birds with Habitat Present in the Monument

Habitat Association or Key Habitat Component	Associated Species	Total Habitat Present in Monument	Season of Use
Low elevation mountain shrublands	Broad-tailed hummingbird, green-tailed towhee, and Virginia's warbler	612	Spring - Summer
Pinyon-juniper woodlands	Juniper titmouse and pinyon jay	1,587	Year-round
Low elevation riparian	Lazuli bunting and MacGillivray's warbler	63	Spring - Summer
Ponderosa pine	Band-tailed pigeon and Grace's warbler	1,752	Spring - Summer
Mixed conifer forests	Dusky grouse	412	Possible year-round
Cliff/rock dependent and open habitats	Golden eagle and prairie falcon	2,296	Year-round
Snags or cavity dependent	Violet-green swallow and Williamson's sapsucker	Suitable snag habitat scattered across Monument	Spring - Summer

As previously mentioned, the diversity of habitats in the Monument provides habitat for numerous migratory bird species. Some of the species are year-round residents, while others leave breeding grounds further south of the area to breed and raise young. Migratory birds are critical links between the vast food chains and webs that exist within an ecosystem. They play many important roles in the Monument such as aiding in plant dispersal by spreading seeds of various plants, helping pollinate various nectar producing plants, serving as biological control agents by consuming insects, serving as biological indicators of healthy ecosystems, and providing watchable wildlife opportunities.

Forest Service Sensitive Species

Sensitive species evaluated are from the Regional Forester's sensitive species list for the Rocky Mountain Region (USDA Forest Service 2013b). Species are designated as sensitive due to concerns over their population status, trends, or habitat conditions. Habitats utilized, season of use, and total available habitat in the Monument are described in Table 17. More detailed information concerning habitat, status and distribution, and risk factors can be found in the LRMP.

Terrestrial sensitive species occupying or potentially occupying the Monument from spring through summer include bats (Fringed myotis, hoary bat, spotted bat, and Townsend's big-eared), peregrine falcon, burrowing owl, flammulated owl, Lewis' woodpecker, northern harrier, and olive-sided flycatcher. Although no studies have been conducted, there is a high probability that all bat species are present in the

area due to available roosting and foraging habitat. Burrowing owls have not been detected; however, potential habitat coincides with occupied prairie dog habitat as the species nests in prairie dog burrows. Flammulated owls have been detected during Mexican spotted owl surveys in ponderosa pine forests containing large snags that provide suitable nest sites. Although there is potential for year-round occupancy by Lewis' woodpecker, the species is more commonly observed from spring through early fall. Northern harriers have been observed flying over grassland areas; however, breeding potential is low due to the limited amount of preferred grassland habitat for foraging and nesting. Olive-sided flycatchers are often observed perched on snags or spike-topped trees on steep-sloped mixed conifer and ponderosa pine forests during migration, with potential breeding occurring in mixed conifer forests.

Early reports of peregrine falcons in the Monument are from the 1940s. The first reported sighting of peregrines occurred in 1943 from personnel staffing the Chimney Rock Fire Lookout Tower who reported peregrines flying around Companion Rock and Chimney Rock. The site was occupied from 1943 to 1965, and from 1965 to 1975 was mostly unoccupied. In 1978, and prior to listing as an endangered species, a seasonal closure was implemented to protect peregrine nesting at the site. In 1981 discussions between the Colorado Division of Wildlife (CDOW) and the Forest were initiated to move forward with a hack project. The hacking project was underway by 1988, and was a technique used to release young peregrines into the wild without the use of natural parents by installing hack boxes onto Companion Rock. The site continued to be monitored by CDOW and Forest Service personnel throughout the 1990s. Although monitoring has not been conducted on a consistent basis from 2000 to present, adult peregrines and young have been reported by visitors, tour guides, and CDOW (now referred to as Colorado Parks and Wildlife or CPW) and Forest Service staff on a regular basis. Peregrines currently nest on Companion Rock, and generally arrive in March and remain in the area through summer.

Sensitive species occupying or potentially occupying the Monument during fall and winter include bald eagles and ferruginous hawks. Bald eagles are commonly observed perched on large snags along ridge tops, feeding on deer and elk carrion along U.S. Highway 160 and State Highway 151, and are often observed in cottonwood trees along the Piedra River. CPW classifies the Piedra River corridor as winter concentration habitat for bald eagles. Ferruginous hawks may migrate through the area given the presence of grasslands and shrubland habitats and adjacent agricultural lands south of the area.

Sensitive species occupying or potentially occupying the Monument year-round include Gunnison's prairie dog, loggerhead shrike and northern goshawk. Prairie dogs are present in grassland habitats in the north and eastern portions of the Monument. The number of prairie dogs present is unknown, and it's likely the population fluctuates due to movement to and from adjacent private and Southern Ute Tribal Lands. Loggerhead shrikes are potential year-round residents associated with riparian, mountain shrublands, open pinyon-juniper woodlands, and grasslands. Although northern goshawk breeding activity has not been detected, the species has been observed during the breeding and non-breeding periods.

Aquatic sensitive species occupying or potentially occupying the Monument year-round include river otter, bluehead sucker, flannelmouth sucker, and roundtail chub. River otters were reintroduced to several river drainages on the Forest from 1989 to 1991. The initial reintroduction effort occurred in the Piedra River and involved 13 river otters from Wisconsin. Since then, otters have been observed in the Piedra River from Navajo Reservoir (south of the Monument), north to Williams Creek Reservoir. Habitat for

bluehead sucker and flannelmouth sucker is present in the Piedra River. Of the two, the flannelmouth is most rare. Both fish species prefer larger rivers and rely on riffle habitats with large cobbles to provide habitat for aquatic macro-invertebrates. Locally, historical and recent accounts of roundtail chub are from the mainstem of the San Juan River. They prefer stream reaches that have a complexity of pool and riffle habitats. Juveniles and adults are typically found in relatively deep, low-velocity habitats that are often associated with woody debris or other types of cover. Potential habitat for roundtail chub is present in the Piedra River and Stollsteimer Creek. Although suitable year-round habitat (overwintering and breeding) is lacking for northern leopard frog, riparian areas may serve as travel corridors to more suitable breeding habitat outside the Monument.

Table 17: FS Sensitive Terrestrial and Aquatic Species with Habitat present in Monument

Species	Basic Habitat Description	Total Habitat in Monument	Season of Use
Mammals			
Fringed myotis	Desert, grassland, and woodland habitats. Roosts in caves, mines, rock crevices, buildings, and other protected sites.	4,305	Spring - Summer
Gunnison's prairie dog	High mountain valleys and plateaus at 1830-3660 m; open or slightly brushy country, scattered junipers and pines. Burrows usually on slopes or in hummocks.	432	Year-round
Hoary Bat	Associated with foliage in trees, mainly ponderosa pine, pinyon/juniper and riparian forest.	3,402	Spring - Summer
River Otter	Stream and river riparian	0.70 miles of Piedra River	Year-round
Spotted bat	Pinyon-juniper, shrub desert, possibly riparian.	2,552	Spring - Summer
Townsend's big-eared bat	Forages in semi-desert shrublands, pinyon-juniper woodlands and open montane forests. Roosts in caves, mines and mature forests.	3,495	Spring - Summer
Birds			
American peregrine falcon	Cliff habitat over 200 feet high with suitable ledges for nest construction.	2,296	Spring - Summer
Bald eagle	Nests and roosts are usually found in open-branched trees near larger lakes, streams, rivers and reservoirs.	2,280 (Winter concentration)	Fall - Winter
Burrowing owl	Open grasslands associated w/ prairie dogs. Nests & roosts in burrows dug by mammals or other animals. Not known to occur on Columbine or Pagosa RDs.	432	Spring - Summer
Ferruginous hawk	Open grasslands & shrub steppe communities. Nest in tall trees or shrubs along streams or on steep slopes. Not known to nest on or near SJNF, but is winter visitor and can occur during non-breeding season.	233	Fall - Winter
Flammulated owl	Depend on cavities for nesting, open forests for foraging, brush for roosting. Occupy open ponderosa pine or forests with similar features (dry montane conifer or aspen, with dense saplings).	2,027	Spring - Summer
Lewis' woodpecker	Open pine forests, burnt over areas with snags and stumps, riparian and rural cottonwoods, and pinyon-juniper woodlands.	2,341	Spring - Summer
Loggerhead shrike	Grassy pastures that are well grazed. Nests in shrubs or small trees, preferably thorny such as hawthorn.	1,391	Year-round
Northern goshawk	Mature forest generalist, often found in ponderosa pine, mixed conifer/aspen stands.	1,089	Year-round
Northern harrier	Marshes, meadows, grasslands, & cultivated fields. Nests on the ground, commonly near low shrubs, in tall weeds or reeds, sometimes in bog; or on top of low bush above water, or on knoll of dry ground, or on	296	Spring - Summer

Species	Basic Habitat Description	Total Habitat in Monument	Season of Use
	higher shrubby ground near water, or on dry marsh vegetation.		
Olive-sided flycatcher	Mature spruce/fir or Douglas-fir forests with preference for natural clearings, bogs, stream and lake shores with water-killed trees, forest burns and logged areas with standing dead trees.	1,007	Spring - Summer
Fish			
Bluehead sucker	Tributaries of the Colorado and San Juan Rivers	0.70 miles of Piedra River	Year-round
Flannelmouth sucker	Tributaries of the Colorado and San Juan Rivers	0.70 miles of Piedra River	Year-round
Roundtail chub	Tributaries of the Colorado and San Juan Rivers	0.70 miles of Piedra River	Year-round
Amphibians			
Northern leopard frog	Riparian and wetland areas.	63	Year-round (active spring - summer)

Federally Listed Species

Federally listed species reviewed are from the most recent FWS species list (USDI Fish and Wildlife Service 2014). Habitats utilized, season of use, and total available habitat in the Monument are described in Table 18. More detailed information concerning habitat, status and distribution, and risk factors can be found in the LRMP.

Potential habitat is present in the Monument for New Mexico meadow jumping mouse, yellow-billed cuckoo, and southwestern willow flycatcher. Habitat for New Mexico meadow jumping mouse includes riparian and wet meadows below approximately 8,000 feet elevation with saturated soils that support tall dense herbaceous vegetation, especially sedges, and absence of livestock grazing. There is no recorded occurrence of the species on the Forest. Although no surveys have been conducted in the Monument, approximately 63 acres of riparian habitat is present. Riparian habitat occurs below 7,000 ft. elevation, has areas with tall herbaceous vegetation present, and have either been closed to grazing for over 20 years or currently receive very little grazing.

Habitat for yellow-billed cuckoo includes lowland riparian forest with tall cottonwood trees, especially with dense undergrowth and thickets. There is no recorded occurrence of the species on the Forest. Although no surveys have been conducted in the Monument, approximately 0.7 miles of low elevation cottonwood/riparian habitat is present along the Piedra River. These areas provide potential habitat rather than suitable habitat for yellow-billed cuckoo as they currently lack the structural characteristics preferred for breeding. Suitable habitat is present along the Piedra River adjacent to the Monument, and it is likely habitat suitability in the Monument could increase in the future.

Habitat for southwestern willow flycatcher includes well-developed willow riparian habitat. To date, the species has only been detected at one location on the Forest containing willow riparian habitat below 8,500 ft. There have been no surveys conducted for southwestern willow flycatcher in the Monument. There are approximately 63 acres of riparian habitat that provide potential habitat for the species.

Habitat for Mexican spotted owl (MSO) includes mature or late successional mixed conifer forest in or adjacent to steep, rocky canyons containing pinyon juniper, Gambel oak and other shrubs, and ponderosa

pine. Locally, the species has been detected in steep, narrow, rocky canyons containing pinyon-juniper, Gambel oak and other shrubs, ponderosa pine, and mixed conifer. Approximately 240 acres of mixed conifer habitat is present in canyons or on steep slopes in the Monument. Additional habitat may be present in steep, rocky canyons containing predominately ponderosa pine and limited mixed conifer vegetation. Surveys for MSO were conducted in 2006 and 2007 for mechanical vegetation treatments emphasizing forest restoration. No MSO's were detected during the surveys. Although habitat is present for MSO, the probability of occurrence is low to moderate based on the limited habitat present, and absence of owls during past surveys.

The Colorado pikeminnow and razorback sucker reside off Forest in the Lower San Juan River. The FWS has determined that water depletions associated with Forest Service actions will affect downstream habitat for these endangered fish. Both fish species are carried forward for analysis due to potential water depletion activities from the San Juan Basin.

Table 18: Federally Listed Species and Candidates for Federal Listing with Habitat in the Monument

Species	Federal Status	Basic Habitat Description	Total Habitat in Monument	Potential Season of Use
New Mexico meadow jumping mouse	Endangered (no critical habitat on SJNF)	Riparian and wet meadows below 8,000 feet elevation with saturated soils that support tall dense herbaceous vegetation, especially sedges, and absence of livestock grazing.	63	Year-round
Mexican spotted owl	Threatened (no critical habitat on SJNF)	Steep cliff-walled canyons with a Douglas-fir, white fir, ponderosa pine/pinyon-juniper component.	240	Year-round
Southwestern willow flycatcher	Endangered (no critical habitat on SJNF)	Riparian habitats along rivers, streams or wetlands where dense growths of willows or other shrub & medium sized trees are present, often with a scattered overstory of cottonwood.	63	Spring - Summer
Yellow-billed cuckoo	Proposed threatened (currently, no proposed critical habitat on SJNF)	Lowland riparian forest and urban areas with tall trees, especially with dense undergrowth and thickets	63	Spring - Summer
Colorado pikeminnow	Endangered (no critical habitat on SJNF)	Tributaries of the Colorado and San Juan Rivers. Affected by water depletions from the Upper Colorado and Upper San Juan River Basins (Forest-wide).	0	None, species occurs off Forest in Lower San Juan River
Razorback sucker	Endangered (no critical habitat on SJNF)	Tributaries of the Colorado and San Juan Rivers. Affected by water depletions from the Upper Colorado and Upper San Juan River Basins (Forest-wide).	0	None, species occurs off Forest in Lower San Juan River

Environmental Consequences

Management activities occurring within the Monument have potential to influence terrestrial and aquatic wildlife habitats, species, or local populations. Management actions that directly affect key habitat features and components, or activities that occur during key use periods and in key use areas, have the

greatest potential to influence species presence and distribution within the Monument. The following analysis discloses effects to terrestrial and aquatic species from activities associated with the Chimney Rock Management Plan and specific projects/actions that are part of the alternatives analyzed in this EIS. The analysis determines how the effects of these actions will influence population trends for MIS, migratory birds at the local and Forest scale, viability of sensitive species, and individual federally listed species.

Management Indicator Species

The LRMP describes management direction for MIS across NFS lands. In general, MIS were chosen as monitoring components for specific planning issues during LRMP development. MIS habitats and populations are monitored in order to assess the effects of management activities, related to specific management issues.

As described in the LRMP, the primary management activities affecting MIS include fuels treatments (Abert's squirrel, elk, and hairy woodpecker), recreation and oil and gas development (elk), and effects to water quality and water temperature (brook trout and brown trout) due to soil erosion and sedimentation associated with ground-disturbing activities such as fuels treatments, oil and gas development, livestock grazing, road construction, and recreation. These management activities all have potential to occur under the various alternatives, but guidance in the proclamation and the Chimney Rock Management Plan generally restricts these activities to those designed to protect archeological resources or other objects of the Monument. In addition to these activities, specific projects such as construction of visitor facilities, parking areas, and construction of interpretive trails will be authorized under Alternatives B and C, resulting in potential additional effects to species such as elk that are more influenced by human disturbance associated with recreation activities. Specific prohibitions common to both action alternatives are also analyzed, and in general, most will result in positive effects to wildlife.

Alternative A (No Action)

Under Alternative A, effects to MIS from activities on NFS lands such as fuels treatments, recreation, oil and gas development, and livestock grazing are expected to be similar to those described in the EIS for the LRMP. Potential impacts to forested habitats and key components utilized by Abert's squirrel, elk, and hairy woodpecker from ongoing or future fuels treatment projects will be minimized, and in many instances enhanced by implementing treatments designed to achieve or move towards desired vegetative composition and structural conditions described in the LRMP. Potential impacts to water quality and temperature in the Piedra River and Stollsteimer Creek from future projects will be minimized with application of LRMP components (standards and guidelines) to minimize impacts from soil erosion and sedimentation, thereby maintaining habitat for brook trout and brown trout.

Under current conditions, the maximum operating season is May 15 – September 30. The presence and distribution of the terrestrial MIS are not expected to be influenced by human presence and disturbance during the operating season. Abert's squirrel and hairy woodpecker are primarily influenced by habitat quantity and quality and presence of key habitat components and forest structural conditions suitable for breeding and foraging. Recreational use during the current operating season has had no reported impacts to Abert's squirrel or hairy woodpecker. Additionally, the area along Stollsteimer Creek that was historically impacted by overgrazing is no longer being grazed and is showing signs of recovery.

Recreational use has had no reported impacts to fish habitat present in the Piedra River for brown trout and rainbow trout as access is limited due to steep terrain and private land.

An increase in dispersed non-motorized recreation during fall, winter, and/or spring is expected as a result of Monument designation. However, this is expected to be a gradual increase that reflects general usage patterns of public lands and special places in the region. The lack of additional facilities such as parking areas near the entrance to the Monument will also limit increases in dispersed use. Disturbance to wintering elk from non-motorized use during migration and use of the area during winter is possible because of dispersed use; however, no appreciable impacts are expected given the abundance of undeveloped winter range habitat, and application of LRMP components for big game winter range and migration corridors. Additionally, public motorized use during winter is currently prohibited, further minimizing impacts to elk.

Alternative A would allow grazing to continue on Peterson Ridge as currently permitted. Livestock grazing was listed as a primary management activity in the LRMP for affecting brown trout and brook trout by causing soil erosion and sedimentation into aquatic habitats. Grazing may also affect vegetative cover along streams potentially influencing water temperature and resting and feeding habitat for trout.

The Peterson Ridge area, located in the Turkey Allotment, currently receives limited grazing by cattle due to the limited availability of water and relative inaccessibility. Consequently, impacts to terrestrial and aquatic MIS from permitted grazing have been minimal. There are no fish-bearing streams in the Turkey Allotment, and permitted grazing is not expected to appreciably impact downstream trout habitat in the Piedra River as no excessive amounts of sediment are expected to be transported downstream via intermittent flows in Peterson Gulch, or via ephemeral drainages. Grazing has potential to influence elk use and distribution in winter range through direct competition for forage, but the application of LRMP rangeland management components (utilization guidelines) should ensure adequate forage availability in big game winter range. In addition, the Turkey Allotment utilizes an adaptive management system which relies on monitoring information to determine if management changes are needed, and if so, what changes, and to what degree.

The continuation of grazing is not expected to appreciably impact MIS. The impacts of grazing would be monitored to determine what impacts livestock are having on the objects of the Monument, including availability and distribution in elk winter range. If unacceptable impacts are identified, then management actions will be taken to eliminate or mitigate these impacts.

Alternative B

Under Alternative B, effects to Abert's squirrel, hairy woodpecker, brown trout, and rainbow trout from management activities are expected to be similar to Alternative A. However, there may be a longer maximum operating season and the potential for more visitors within the Monument as compared to Alternative A.

The maximum operating season will be May 1 – October 31, approximately 1½ months longer than Alternative A. Over time, visitor use is expected to increase more than Alternative A with the potential for additional visitor facilities and interpretive services, and a longer maximum operating season. The potential increase in use and associated human disturbance are not expected to appreciably impact MIS during the maximum operating season for reasons described under Alternative A.

As in Alternative A, public motorized use during winter is prohibited. However, because additional parking may be provided by the entrance, dispersed, non-motorized winter recreation has potential to increase slightly more than Alternative A; thereby, increasing disturbance to wintering big game. Impacts to wintering big game will be minimized by implementing guidance found in the Chimney Rock Management Plan. Specifically, a standard has been included in the management plan which addresses big game winter range and migration corridors. Additionally, elk use on winter range within the Monument will be monitored through close coordination with the Southern Ute Indian Tribe and Colorado Parks and Wildlife. An adaptive management process will be utilized to address potential impacts associated with dispersed winter recreation. Adaptive management strategies may include limiting public use in winter range from December 1 – April 30 if monitoring shows this is necessary.

The 826 acres of the Turkey Grazing Allotment within the Monument will be closed to livestock grazing, thereby eliminating any potential impacts to downstream fish habitat in the Piedra River, increasing the amount of forage available for wintering big game, and eliminating the need for monitoring of livestock impacts to the wildlife resources.

Alternative C

Under Alternative C, effects to MIS from management activities are expected to be similar to Alternative B. However, there may be a longer maximum operating season and the potential for more visitors within the Monument as compared to Alternatives A or B.

The maximum operating season under Alternative C may extend from April 1 – November 31, approximately 2 months longer than Alternative B and 3½ months longer than Alternative A. Visitor use is expected to increase more than Alternatives A or B given additional visitor facilities and interpretive services, and longer operating season. The increase in use and associated human disturbances are not expected to appreciably impact Abert's squirrel, hairy woodpecker, brown trout or rainbow trout for reasons described under Alternative A. Guided tours beginning April 1 will overlap with big game winter use, resulting in increased disturbance to big game, impacting wintering big game more than Alternatives A and B. Additionally, dispersed winter recreation has potential to increase more than Alternative B if more parking is provided, further increasing disturbance to wintering big game. Impacts to wintering big game will be minimized as described under Alternative B.

Under Alternative C, livestock grazing in the Peterson Ridge portion of the Turkey Allotment would continue under an adaptive management strategy. Therefore, impacts would be similar as described under Alternative A; however, potential impacts are expected to be addressed more efficiently and in a timely manner, due to the more focused monitoring effort to ensure rangeland conditions achieve desired vegetative conditions.

In summary, based on the analysis and application of LRMP and Chimney Rock Management Plan components, potential impacts to MIS are expected to be greater under Alternative C, followed by Alternatives A and B. In general, impacts to MIS correspond with the level of ground disturbing activity for managing visitor and interpretive services, and other management activities such as fire/fuels management, livestock grazing, and other management actions.

Effects to Forest-wide habitat and population trends

Continued management of the Monument has the potential to influence Forest-level habitat and population trends for MIS. In particular, projects designed to improve forest health while protecting objects of the Monument will have positive effects to Forest-wide habitat trends. Additionally, there are numerous plan components in both the LRMP and the Chimney Rock Management Plan that will help minimize impacts from management activities, thereby reducing any negative incremental effects to MIS habitat and population trends over the long-term.

Migratory Birds

As describe in the LRMP, management activities most influential to migratory birds include prescribed burning, mechanical fuels treatments, lands and special use authorizations, oil and gas development, livestock grazing, and recreation activities. Effects to migratory birds from these activities include habitat loss or alteration resulting in short- or long-term displacement, shift in species use of available habitat, and reduced habitat effectiveness in areas where human disturbances exceed species tolerances. The extent of these impacts depends on the size, timing, frequency, and duration of the activities and application of LRMP components.

Alternative A (No Action)

Direct and indirect effects from management actions occurring under Alternative A are expected to be similar to those described above. Potential impacts to migratory birds will be minimized by implementing the guidance in the LRMP for undertaking proactive bird conservation measures as practicable to maintain or improve habitat needs for species, and many other plan components that maintain or otherwise mitigate adverse impacts to habitat utilized by migratory birds. In many cases, habitat for migratory birds will be enhanced by implementing treatments designed to achieve or move towards desired vegetative composition and structural conditions . For example, projects (prescribed burning and mechanical vegetation treatments) designed to increase age-class diversity of shrubland habitat will sustain habitat in the long-term for green-tailed towhee, Virginia's warbler and other species. Projects that restore the health of ponderosa pine forests will enhance habitat for Grace's warbler and band-tailed pigeon. Potential impacts to riparian habitat along the Piedra River and Stollsteimer Creek will be minimized by applying LRMP components for minimizing impacts from soil erosion and sedimentation, thereby maintaining habitat for species such as Lazuli bunting and MacGillivray's warbler.

Under Alternative A, the maximum operating season will be May 15 – September 30. The presence and distribution of most migratory birds evaluated are not expected to be appreciably influenced by human presence and disturbance during the breeding season. Migratory birds are primarily influenced by habitat quantity and quality and presence of key habitat components and forest structural conditions suitable for breeding and foraging. There have been no reported impacts to migratory birds from human presence and disturbances during the current operating season. Some migratory bird species, such as peregrine falcon and golden eagle, are very susceptible to disturbance. For these species, measures have been implemented during past projects to reduce potential impacts. These measures will continue to be implemented for projects within the Monument, in compliance with the LRMP.

There have been no reported impacts to migratory birds from human presence and disturbance outside the general operating season (fall-winter). Most migratory birds have migrated out of the area to wintering

grounds in southern portions of the U.S and further south into Mexico and Central America. For those remaining in the area (pinyon jay, golden eagle, prairie falcon, juniper titmouse and others) disturbance from humans is expected to be limited, as the area is closed to motorized use, and increases in dispersed winter recreation are expected to be minimal, as no additional facilities such as parking areas near the entrance to the Monument will be constructed. Additionally, there is abundant undeveloped habitat for fall and winter residents across the Monument.

Livestock grazing under Alternative A has potential to impact habitat for migratory birds associated with grasslands, shrublands, and riparian areas. Livestock generally tend to congregate along forest edges, grassland openings, and along riparian areas. These same areas provide foraging and nesting sites for migratory birds. Potential impacts to migratory birds are associated with competition for forage (grass seeds, berries, etc.) and alteration of nesting habitat (grasses, sedges, and shrubs) and potential trampling of nest sites. Because the Peterson Ridge area receives limited use by permitted livestock, impacts to migratory birds are expected to be minimal. Impacts will continue to be minimized through monitoring and adaptive management, and through the application of LRMP livestock grazing utilization standards and other components for maintaining rangeland conditions.

Alternative B

Direct and indirect effects from management actions under Alternative B are expected to be similar to those described under Alternative A. The construction of additional visitor and interpretive facilities will result in additional, small-scale habitat loss for migratory birds. Migratory birds are susceptible to human-caused mortality associated with facilities that encourage or facilitate access into confined spaces. Impacts to migratory birds from the construction, reconstruction, and placement of recreational facilities will be minimized by applying the Chimney Rock Management Plan wildlife-human conflict abatement standard that addresses minimizing wildlife entrapment and access to human attractants.

Human presence associated with increased use of recreational facilities during the May 1-October 31 operating season may reduce habitat effectiveness in the immediate areas for species that show little tolerance for human disturbance. Consequently, human disturbance impacts are expected to be slightly greater than Alternative A. Impacts to migratory birds from dispersed non-motorized recreation during fall and winter are expected to be similar to Alternative A.

The closure of approximately 826 acres of the Turkey Grazing Allotment to livestock grazing will have positive effects to migratory birds, particularly those utilizing mountain grasslands, mountain shrublands, and low elevation riparian habitat by eliminating any potential impacts to migratory birds or their habitat.

Alternative C

Direct and indirect effects from management actions occurring under Alternative C are expected to be similar to Alternative's A and B. The construction of more visitor and interpretive facilities under this alternative than under Alternative B will result in additional, small-scale habitat loss and reduced habitat effectiveness for migratory birds. The overall effects from habitat loss, and reduced habitat effectiveness from these facilities are expected to be greater than Alternatives A and B given the longer operating season April 1-November 30 and increased public use.

The adaptive management grazing strategy proposed under Alternative C will have similar impacts to migratory birds as Alternative A; however, potential impacts are expected to be addressed more efficiently and in a timely manner, due to the more focused monitoring effort required by the Chimney Rock Management Plan.

In summary, based on the analysis and application of LRMP and Chimney Rock Management Plan components, potential impacts to migratory birds are expected to be greater under Alternative C, followed by Alternatives A and B. In general, impacts to bird species correspond with the level of ground disturbing activity for managing visitor and interpretive services, and other management activities such as fire/fuels management, livestock grazing, and other management actions. The overall extent and magnitude of impacts from all Alternatives are expected to be low; therefore none of the Alternatives are expected to result in population-level impacts or in changes to species distribution across the Monument or the Forest.

Forest Service Sensitive Species

Management activities that are most influential to sensitive species are similar to those described for MIS and migratory birds. However, the magnitude of effects to sensitive species may be greater as their occurrences and distributions are more limited across the Monument as compared to MIS and migratory birds. Management actions that emphasize ground-disturbing activities in or near primary habitats for sensitive species (nest sites, roost sites, production areas, and winter areas) will have more potential to impact sensitive species.

Alternative A (No Action)

Direct and indirect effects from management activities under Alternative A are expected to be similar to those described in the LRMP and LRMP Biological Evaluation (BE). Potential impacts to sensitive species from management actions will be minimized by implementing LRMP components such as management for forest structural stage and canopy cover objectives, retention of snags and downed woody debris, maintenance of wetlands and water dependent features, applying timing and ground disturbing restrictions for sensitive raptors, and others. In many cases, habitat for sensitive species will be enhanced by implementing treatments designed to achieve or move towards desired vegetative composition and structural conditions described in the LRMP. For example, projects designed to restore the health of ponderosa pine forests (prescribed burning and mechanical vegetation treatments) will sustain habitat in the long-term for species that evolved with natural processes that influence the structure and composition of pine forests such as sensitive bats, flammulated owl, Lewis' woodpecker, and northern goshawk. Potential impacts to riparian habitat along the Piedra River and Stollsteimer Creek will be minimized by applying LRMP components to minimize impacts from soil erosion and sedimentation, thereby maintaining habitat for species such as bald eagle, bluehead sucker, flannelmouth sucker, roundtail chub, river otter and northern leopard frog.

The maximum operating season for visitor and interpretive services will be May 15-September 30. During this period, the presence and distribution of most sensitive species evaluated are not expected to be appreciably impacted by human presence and disturbance during key use periods (breeding and rearing young). Many of the existing visitor and interpretive facilities are located near habitat occupied by or used by species such as Gunnison's prairie dog, flammulated owl, Lewis' woodpecker, and olive-sided

flycatcher with no apparent adverse response by the species. Based on local observations (including some within the Monument) and scientific literature, other species are less tolerant of human disturbances, especially disturbances that affect breeding activity or habitat used for rearing young. Species less tolerant of human disturbances include sensitive bats and raptors, particularly northern goshawk and peregrine falcon. With the exception of peregrine falcon, there are no breeding or roost sites for bats or raptors near existing visitor and interpretive facilities; however, use (foraging or dispersal) may occur when human activity levels are low or nonexistent. In the case of peregrine falcon, nesting and perching sites are located above eye-level of most human disturbances associated with existing trails and parking areas. LRMP components will be applied for projects/activities that have potential to negatively impact sensitive bats and raptors.

There have been no reported impacts to sensitive species from human presence and disturbance outside of the general operating season (fall-winter). For those species remaining in the area and active during fall and winter seasons (bald eagle, ferruginous hawk, loggerhead shrike, and northern goshawk), human disturbances are expected to be limited, as the area will be closed to motorized use, and there will be minimal increases in dispersed winter recreation since no additional facilities such as parking areas near the entrance to the Monument will be constructed. Of the eight fall/winter resident sensitive species, two are generally inactive during winter (Gunnison's prairie dog and northern leopard frog), four are generally not influenced by humans due to very limited access to habitat (bluehead sucker, flannelmouth sucker, roundtail chub, and river otter), and foraging and security habitat is abundant for two species (loggerhead shrike and northern goshawk) across the Monument.

Livestock grazing under Alternative A has potential to impact habitat for sensitive species associated with grasslands, shrublands, and riparian areas. Sensitive species potentially affected by livestock grazing includes sensitive bats that forage on insects along forest edges, grassland openings and riparian areas. Grazing that appreciably alters vegetative cover and forage for insects may affect prey availability for bats. Grazing in riparian areas may alter vegetation used for breeding or habitat for prey species, thus impacting habitat for Lewis woodpecker, northern harrier, northern goshawk, and northern leopard frog. Because the Peterson Ridge area receives minimal grazing by permitted livestock, impacts to sensitive wildlife species are expected to be minimal. Impacts will continue to be minimized through monitoring and adaptive management, and through the application of LRMP livestock grazing utilization standards and other components for maintaining rangeland conditions. No appreciable impacts are expected to sensitive fish species for reasons described in the MIS section for brown and rainbow trout.

Alternative B

Direct and indirect effects from management activities under Alternative B are expected to be similar to Alternative A. The construction of visitor and interpretive facilities will result in additional, small-scale habitat loss for some sensitive species including those more tolerant of human disturbance, as described under Alternative A. Impacts to sensitive species from the construction, reconstruction, and placement of recreational facilities, and from management activities, will be minimized by applying Chimney Rock Management Plan and LRMP components.

Human disturbance associated with new recreational facilities, and increased use during the May 1-October 31 maximum operating season, may reduce habitat effectiveness in the immediate areas for species that show little tolerance for disturbance as described under Alternative A. Specific prohibitions

will be implemented to protect species such as peregrine falcon by closing approximately 400 acres surrounding Chimney Rock and Companion Rock to public entry from March 15 to July 31 (with the exception of use along the Great House Trail), and prohibiting public entry into the 3 acres surrounding Chimney Rock and Companion Rock to minimize disturbance during breeding season and prevent rock climbing and potential negative impacts to nesting habitat on the spires. Chimney Rock Management Plan and LRMP components that minimize disturbance impacts to sensitive bats and other forest raptors will also be applied. Impacts to sensitive species during the fall and winter seasons are expected to be similar to Alternative A.

The Peterson Ridge area will be closed to livestock grazing, thereby eliminating any potential impacts to sensitive wildlife species utilizing mountain grasslands, shrublands, and riparian areas, and eliminating the need for monitoring of livestock impacts to sensitive wildlife species.

Alternative C

Direct and indirect effects from management activities under Alternative C are expected to be similar to Alternatives A and B. The construction of additional visitor and interpretive facilities will result in additional, small-scale habitat loss and reduced habitat effectiveness for sensitive species, including those more tolerant of human disturbance. The overall effects from habitat loss, and reduced habitat effectiveness from these facilities are expected to be greater than Alternatives A and B given the longer maximum operating season April 1-November 30 and increased use. Impacts to sensitive species from the construction of visitor and interpretive facilities and from management activities will be minimized by applying Chimney Rock Management Plan and LRMP components. Prohibitions designed to protect breeding habitat for peregrine falcon are the same as Alternative B.

The adaptive management grazing strategy proposed under Alternative C will have similar impacts to sensitive species as Alternative A; however, potential impacts are expected to be addressed more efficiently and in a timely manner, due to the more focused monitoring effort required by the Chimney Rock Management Plan.

In summary, based on the analysis and application of Chimney Rock Management Plan and LRMP standards and guidelines, potential impacts to sensitive species are expected to be greater under Alternative C, followed by Alternatives A and B. The overall extent and magnitude of impacts from all Alternatives are expected to be low; therefore none of the Alternatives are expected to affect the viability of any sensitive species across the Forest.

Federally Listed Species

Management activities potentially affecting federally listed species and species proposed for federal listing are similar to those described for sensitive species. The overall effects to species may be greater as their occurrences and distributions are limited and restricted to specific habitats across the Monument and the Forest. For these reasons, management actions that affect listed species and species proposed for federal listing are consulted on with the U.S. Fish and Wildlife Service as required under the Endangered Species Act.

Federally listed species containing potential habitat in the Monument include New Mexico meadow jumping mouse and southwestern willow flycatcher. Species proposed for federal listing with potential habitat in Monument include yellow-billed cuckoo. Habitat for New Mexico meadow jumping mouse,

yellow-billed cuckoo and southwestern willow flycatcher have been identified as potential rather than suitable as habitat within the Monument currently lacks some of the key vegetative characteristics that supports known populations elsewhere in the species range. However, since these vegetative characteristics may develop over time, it is prudent to evaluate effects to habitats from management actions occurring under the Chimney Rock Management Plan. A limited amount of suitable habitat is also present for MSO within the Monument. Habitat for MSO has been surveyed and to date, no detections have been made.

Alternative A (No Action)

Direct and indirect effects to federally listed species and species proposed for federal listing under Alternative A will depend largely on future management activities occurring in the Monument. The effects from future management activities such as livestock grazing, prescribed fire, mechanical vegetation treatments for forest restoration, lands and special uses, and others will depend on location, scale, timing, and other factors. The effects from future management actions will undergo a separate, more site-specific analysis at the time a project is proposed, and consultation with FWS as needed. In general, effects to federally listed species and habitats are expected to be similar to those described in the LRMP BA for Mexican spotted owl, southwestern willow flycatcher, razorback sucker and Colorado pikeminnow. Effects to New Mexico meadow jumping mouse and yellow-billed cuckoo are expected to be similar to those described in the LRMP BE. Overall, management actions are expected to have minimal effects to all species given the location of potential and suitable habitats present, and the lack of management activities/influences expected in these areas. Potential impacts to listed species from management actions will be minimized by implementing standards and guidelines described in the LRMP BA and the BE.

Alternative B

Direct and indirect effects to federally listed species and species proposed for federal listing from management activities under Alternative B are expected to be the same as Alternative A. The construction of visitor and interpretive facilities under Alternative B will have no effect to any listed or proposed species as none of the facilities or corresponding activities (human presence/disturbance) will occur in potential or suitable habitat for listed species or species proposed for federal listing. The effects from future management actions will undergo a separate, more site-specific analysis, and consultation with FWS as needed.

Alternative C

Direct and indirect effects of management activities under Alternative C on federally listed species and species proposed for federal listing are expected to be the same as Alternatives A and B. The construction of visitor and interpretive facilities may exceed those under Alternative B, but will not affect any species for reasons described under Alternative B. The effects from future management actions will undergo a separate, more site-specific analysis, and consultation with FWS as needed.

In summary, the effects to listed species and species proposed for listing from management actions will undergo a separate, more site-specific analysis, and consultation with FWS as needed. The construction of visitor and interpretive facilities under Alternatives B and C will have no effect to any listed or

proposed species as none of the facilities or corresponding activities (human presence/disturbance) will occur in potential or suitable habitat for any species.

Cumulative Impacts

As described above, there have been a wide variety of activities occurring in the Chimney Rock National Monument in the past and present that have influenced habitat for fish and wildlife species. Additionally, public lands adjacent to the Monument have experienced a long history of management activities including those most influential to species and habitats such as timber harvest, livestock grazing, prescribed and wildfire management, summer and winter recreation, and gathering of forest products (firewood, rocks/minerals, and tree seedlings for transplants). Private lands near the Monument have experienced residential development, and it is reasonable to assume this trend may continue. Forests and grasslands on adjacent tribal lands are managed similarly to NFS lands in and adjacent to the Monument.

The minor loss of habitat in the Monument associated with the development of recreation facilities will have varying effects to species as described in the analysis. Some species will be negatively affected (those most sensitive to disturbance and habitat alteration), others may be positively affected (those more habituated to humans and human activities), and others may be unaffected. Additionally, other management actions occurring in the Monument have potential to affect species. Under Alternative A, management actions will occur under management direction in the LRMP, and under the LRMP and Chimney Rock Management Plan for Alternatives B and C. The direction in both plans provides opportunities to conduct management consistent with protecting objectives of the Monument as described in the proclamation, thereby minimizing impacts to species and habitats, and in many instances enhancing habitat for wildlife.

Actions occurring on adjacent private and Southern Ute Indian Reservation (SUIT) lands have potential to influence habitat for wildlife, thus increasing the importance of the Monument for wildlife. For example, land development on adjacent private lands could disrupt migration patterns for wintering big game or reduce the quality of important winter foraging habitat. Under this scenario, the importance of winter range for big game across the Monument is elevated given the likelihood of increased use in terms of overall number of animals present and duration of use. Effects to species from activities occurring on adjacent SUIT lands are expected to be similar to those occurring on NFS lands.

Cumulatively, activities occurring on adjacent private and SUIT lands, combined with the proposed action and reasonably foreseeable future actions will continue to affect habitat capability and effectiveness for MIS, migratory birds, sensitive species, and other species occupying habitats in and adjacent to the Monument. The resulting effects to fish and wildlife are expected to be positive and negative, occurring at relatively small scales. Negative effects may include displacement of some species (short-term and/or long-term), shifts in behavior, and shifts in use patterns. With application of management plan and LRMP standards and guidelines, negative effects are expected to be minor for most species. With the application of standards and guidelines monitoring of key resource concerns, the proposed action is not expected to contribute any appreciable cumulative impacts to fish or wildlife species, or affect species viability on the SJNF.

3.12 Lands and Special Uses

Affected Environment

The lands program is responsible for various aspects of ownership and management of uses on NFS lands, as described in Section 3.18.2 of the LRMP. All of the lands within the Chimney Rock National Monument boundary are federally owned, but there are numerous, non-federal, authorized uses of NFS lands that occur in conjunction with rights-of-ways for SH 151, CR 917, private roads, telephone lines, power lines, and gas pipelines. Other uses currently allowed on NFS lands within the Monument include oil and gas monitoring wells, ditches, water pipelines, and ponds. In the past, research projects, commercial filming, and commercial still photography have also been authorized.

All of the authorized uses listed above are managed through permits and easements issued by the USFS. Unauthorized activities, including fences and trespass grazing, also occur within the Monument. Forest Service policy requires that unauthorized uses must either be permitted if found to be appropriate, or eliminated if not appropriate. It is also likely that additional uses may be requested in the future as the need arises. These uses will be analyzed on a case-by-case basis and authorized when appropriate.

The marking of NFS land boundaries helps in the prevention of unauthorized uses and trespass onto NFS lands. To date, approximately sixty percent of the Monument boundary has been surveyed and posted. The rest of the boundary will be surveyed and posted as time and funding allow.

Environmental Consequences

Alternative A (No Action)

Under Alternative A, the existing land uses described above will continue to be authorized through special use authorizations as long as they meet the requirements outlined in the authorizations and operation and maintenance (O&M) plans. Ground disturbing activities associated with the use, maintenance, reconstruction, or repair of authorized facilities may result in impacts to lands within the Monument. These impacts generally occur in localized areas that are already impacted, such as along highway or utility corridor rights-of-way. Impacts in these areas are minimized by the application of requirements that are included as part of all O&M plans that require ground disturbance to be minimized and rehabilitated. The requirements contained in existing authorizations should be adequate to protect the objects of the Monument; however, they may also be amended to prevent adverse impacts to objects of the Monument if necessary.

New special use authorizations may also be issued. The issuance of these authorizations would be subject to direction found in the LRMP and proclamation. Requests for new uses are evaluated to determine if they pass the screening criteria for them to be an appropriate use of NFS land. If the proposal passes the screening criteria, a site specific environmental analysis is conducted (including Section 106 consultation) and appropriate design criteria recommended. Impacts from new authorizations may be greater than those for existing authorizations in the short term if construction is required. After the initial construction is done, the impacts will be similar to those described for existing authorizations, but it is possible that impacts may occur outside of existing right-of-ways. In order to meet the intent of the proclamation to

protect the objects of the Monument, specific requirements would have to be included in the O&M plan to ensure that the objects of the Monument are protected.

Effects of any existing unauthorized uses that may be authorized will be similar to those described for existing uses. Removal of unauthorized improvements such as fences and uses such as trespass grazing will eliminate impacts from these uses.

Alternative B and C

Under both Alternatives B and C, the existing land uses within the Monument described above will continue to be authorized through special use authorizations as long as they meet the requirements outlined in the authorizations and O&M plans. Impacts from the use, maintenance, reconstruction, or repair of authorized facilities will be similar to those described under Alternative A.

Under both Alternatives B and C, new non-recreation special use authorizations for new facilities are prohibited unless they are within existing utility corridors or along existing roads. This affords stronger protection to the objects of the Monument as compared to Alternative A by limiting new authorizations to previously disturbed and developed areas.

Effects of any existing unauthorized uses that may be authorized will be similar to those described for existing uses. Removal of unauthorized improvements such as fences and prevention of trespass grazing will eliminate impacts from these uses.

Cumulative Impacts

The adoption of the Chimney Rock Management Plan, specific prohibitions, and the potential construction of new facilities at the Monument combined with past, present, reasonably foreseeable future activities will have no cumulative impacts on the special uses within the Monument or the lands program.

3.13 Rangeland Management

Affected Environment

Livestock grazing has been occurring within the boundaries of the Chimney Rock National Monument since at least the early 1900's. Currently, there are two livestock grazing allotments designated within the boundaries of the Monument. This includes the Chimney Rock Cattle and Horse (C&H) Allotment on the Pagosa Ranger District which is currently closed and has not been grazed by permitted livestock since 1974, and the Turkey C&H Allotment on the Columbine Ranger District, which is currently open and being grazed. The following describes the current and historic management, use patterns, and general rangeland vegetative conditions on these two allotments.

Chimney Rock C&H

The area of the Monument east of the Piedra River is part of the closed Chimney Rock Allotment. The total NFS acreage of this allotment is 14,628 acres. Approximately 3,900 of these acres are within the Monument. Dominant rangeland forage within the Monument consists of Kentucky bluegrass (*Poa pratensis*), western wheatgrass (*Agropyron smithii*), crested wheatgrass (*Agropyron cristatum*) and smooth brome (*Bromus inermis*).

A search of historic records indicates that domestic livestock grazing was occurring in the Chimney Rock area as early as the 1920's, and likely earlier. Schmoll (1932) reported that "*sheep were grazing the entire mesa during 1924*". However, records from the 1940's indicate that most of the historic grazing in the area was by cattle. These records show the typical season of use during the 1940's and 1950's was from May 16 – June 15. The number and class of livestock at this time were 100 – 150 cow/calf pairs. During this timeframe, in an effort to increase the amount of forage available for domestic livestock and wildlife, many areas, including areas currently within the Monument, were reseeded to crested wheatgrass, alfalfa (*Medicago sativa*), or smooth brome. During the 1950's and 1960's a number of activities designed to reduce conflicts between domestic livestock grazing and wildlife in the Chimney Rock area took place, including the installation of fences to aid in livestock distribution and construction of new water developments. However, due to the persistent lack of water in late summer and fall, and the ongoing conflict between cattle grazing and key fall, winter, and spring big game grazing, the Chimney Rock Allotment was closed to livestock grazing in 1974.

In more recent years, there have been issues with horses trespassing onto the closed Chimney Rock Allotment from surrounding private land on the south side of the Monument due to improper fence alignment.

Turkey C&H

The area of the Monument west of the Piedra River is part of the currently active Turkey Allotment. There are 8,312 acres of NFS lands within this allotment. Currently, 127 cow/calf pairs are permitted on the allotment with a season of use from June 1 – June 30. The allotment is managed using a 2-pasture rotation system. An environmental analysis completed in 2006 adopted an adaptive management system that relies on monitoring to determine if management changes are needed, and if so, what changes, and to what degree.

Historic records indicate that domestic livestock grazing has been occurring in the area currently covered by the Turkey Allotment since the late 1800's. Historically, the Turkey Allotment covered a much larger area, including Pole Gulch, Fossett Gulch, Peterson Ridge, Turkey Creek, Goose Creek, Skull Canyon, and Ignacio Canyon. In 1972, the allotment boundaries were redrawn so that the south end (Turkey Creek, Goose Creek, Skull Canyon and Ignacio Canyon) were withdrawn from grazing. This reduced allotment acreage by approximately one half, and was done primarily for soil and water protection as these areas were in poor rangeland health. Within the remaining area (the current 8,312 acre allotment), numbers were reduced to 154 head and the season reduced to the current permitted season of use of June 1 – June 30. In 1979 the numbers were further reduced to the current permitted number of 127 cow/calf pairs.

Approximately 826 acres of the 8,312-acre Turkey Allotment are within the Monument; a majority of this is in the Peterson Ridge area. Approximately 510 of the 826 acres are considered capable of supporting cattle grazing. The areas not capable of supporting cattle grazing include areas dominated by a high percentage of rock outcrops and steep slopes greater than 40%. Dominant rangeland forage on Peterson Ridge consists of Thurber fescue (*Festuca thurberi*), Kentucky bluegrass, western wheatgrass, smooth brome, and mountain brome (*Bromus marginatus*).

The Peterson Ridge area of the Turkey Allotment has limited water availability with only one 250-gallon guzzler on the north end (not within the Monument) and one spring development with stock pond on the

south end (within the Monument). Access to the Peterson Ridge area is also difficult since it is bounded to the north, east, and south by private land. The only access to the area from NFS lands is from the Fosset Gulch area to the west. Topographic features and the steep terrain of Fosset Gulch make moving cattle through Fossett Gulch to Peterson Ridge difficult. Due to the limited availability of water and relative inaccessibility, permittees do not actively drive cattle into the area, but a few pairs will usually drift into the area on their own and stay until the end of the permitted grazing season. Because of the minimal use of the area, very few livestock related impacts have been noted during recent monitoring. Prior to designation of the Monument, efforts had begun to increase use in the Peterson ridge area to help distribute livestock use more evenly across the entire allotment and ease grazing pressure around the limited water sources in other areas of the allotment. This included an initial plan to add water sources (additional guzzlers or ponds) to the portion of the allotment that is now part of the Monument. However, these efforts were put on hold pending additional direction related to management of the Monument.

There are also ongoing issues with horses trespassing from private land into the Peterson Ridge area due to a lack of adequate fences. At this time, it appears use by trespass horses is having more impacts on the rangelands in the Peterson Ridge area than use by permitted cattle.

Environmental Consequences

Under Alternative A, guidance for the management of livestock grazing is found in the 2013 LRMP and the proclamation. Alternative C follows this same direction, and adds direction found in the Chimney Rock Management Plan. The suitability of cattle grazing within the Monument varies by alternative. Under Alternatives A and C, the portion of the Turkey Allotment within the Monument (826 acres) would be considered suitable for cattle grazing and would remain open. Under Alternative B, the portion of the Turkey Allotment within the Monument would not be considered suitable, and this portion of the allotment would be closed. The Chimney Rock Allotment is not considered suitable for livestock grazing under any of the alternatives and will remain closed. Table 19 displays the number of acres by allotment and the number of acres considered suitable for grazing under each alternative. Impacts to the portion of the Turkey Allotment within the Monument will vary by alternative and are discussed below.

Alternative A (No Action)

Under Alternative A, the portion of the Turkey Allotment within the Monument would be considered suitable for cattle grazing. Grazing by permitted livestock would continue under an adaptive management strategy and the 826 acres of the Turkey Allotment within the Monument would remain open. It is anticipated that without additional water developments or a concerted effort by the permittee to push cattle into the area that the area will continue to receive minimal use by permitted livestock. Under the adaptive management strategy, monitoring of rangeland health, vegetative conditions, and archeological and biological resources will help determine if management changes are needed, and if so, what changes and to what degree. This monitoring and the application of any needed management changes will ensure the protection and proper care of the objects of the Monument as required by the proclamation. Potential management changes could include the construction of additional range improvements such as fences or water developments, providing these range improvements do not damage the objects of the Monument. It could also include changes in livestock numbers, changes in season of use, or removal of livestock from the area.

Alternative B

Under Alternative B, the portion of the Turkey Allotment within the Monument would not be considered suitable for cattle grazing, and would be closed, reducing the amount of lands suitable for livestock grazing by 826 acres (Table 19). The remaining 7,486 acres of the Turkey Allotment would remain open for grazing. However, the one spring development with stock pond on the south end of the mesa that supplies most of the water to livestock grazing in the general Peterson Ridge area is within the area that would be closed and would therefore no longer be available for use by permitted livestock. Additional fencing may be required in order to prevent cattle from drifting into the area. Effectively closing this portion of the allotment would ensure that livestock grazing would not negatively impact the objects of the Monument.

Decreasing the number of acres available for cattle grazing, as well as reducing the amount of water available for cattle use, could have impacts to the future grazing management strategies on the rest of the Turkey Allotment. As stated in the affected environment, prior to Monument designation, efforts had begun to increase use in the Peterson Ridge area to help distribute livestock more evenly across the entire allotment and ease grazing pressure around the limited water sources in other areas of the allotment. If the area within the Monument is closed to grazing, this would no longer be possible and other adaptive management solutions to ease grazing pressure in the Turkey Allotment would have to be pursued. This could include a reduction in permitted grazing season and/or livestock numbers.

Alternative C

Under Alternative C, the portion of the Turkey Allotment within the Monument would continue to be considered suitable for cattle grazing. Grazing by permitted livestock would continue under an adaptive management strategy and the 826 acres of the Turkey Allotment within the Monument would remain open. As in Alternative A, it is anticipated that without additional water developments or a concerted effort by the permittee to push cattle into the area that the area will continue to receive minimal use by permitted livestock. The impacts of this alternative would be similar to those described under Alternative A, but there is the potential for more recreation use of the Peterson Ridge area since this alternative emphasizes increased visitor and interpretive services and more developed access. If visitation to Peterson Ridge does increase, livestock distribution and rotation patterns could be disrupted by visitors, making management of both livestock operations and recreational use more difficult.

Alternative C also provides a greater emphasis on monitoring and additional livestock and rangeland management direction as compared to Alternative A. The Chimney Rock Management Plan contains specific standards requiring grazing management practices to utilize measures to avoid or minimize impacts to archaeological sites and other objects of the Monument. There are also specific objectives within the plan that call for annual monitoring of livestock grazing impacts. The monitoring associated with adaptive management and the Chimney Rock Management Plan, and the application of any needed management changes, will ensure the protection and proper care of the objects of the Monument. Potential management changes are the same as those described under Alternative A.

Table 19: Allotment Acreage and Suitability

Allotment	Total NFS Acres in Allotment	Total NFS Acres in Monument	Total Suitable NFS Acres in Monument by Alternative
Chimney Rock	14,628	3,900	Alternative A – 0 acres Alternative B – 0 acres Alternative C – 0 acres
Turkey	8,312	826	Alternative A – 826 acres Alternative B – 0 acres Alternative C – 826 acres

Cumulative Impacts

The Turkey Allotment has been grazed since the late 1800's. Over time, the amount of area considered suitable for livestock grazing on this allotment has been reduced due to a limited amount of water available to livestock, concerns over poor rangeland conditions, conflicts between big game use and livestock grazing, and increasing tree density and a corresponding loss of understory forage caused by fire suppression. Current activities that are affecting livestock grazing and rangelands on the Turkey Allotment include ongoing drought reducing available forage and water, ongoing conflicts between big game use and livestock grazing, development of nearby private lands, trespass horse grazing, and the designation of the Chimney Rock National Monument and the related need to protect the objects of the Monument. Foreseeable future activities that could impact the Turkey Allotment include a potential fuels reduction and forest health project in the Faucett Gulch area that could increase forage availability in the Turkey Allotment over the long term. Future activities also include the implementation of adaptive management actions needed to protect the objects of the Monument. This could include the construction of range improvements to draw livestock away from areas of concern, reductions in permitted grazing season, reductions in livestock numbers, and/or closure of portions of the allotment. Other foreseeable future activities include potential increases in visitation levels, construction of additional trails, development of private lands near the Monument, and continued trespass by non-permitted livestock.

Under Alternative B, the closure of the portion of the Turkey Allotment within the Monument combined with the past, present, and foreseeable future activities listed above, could have a negative cumulative impact on livestock grazing and a minor, positive cumulative impact on rangelands. Under Alternative A and C, the addition monitoring required by the proclamation and the Chimney Rock Management Plan that would be required to protect the objects of the Monument, combined with the past, present, and foreseeable future activities listed above, could also have a negative cumulative impact on livestock grazing and a minor positive cumulative impact on rangelands.

3.14 Fuels and Fire Management

Affected Environment

Fire management on the SJNF is dictated first and foremost by firefighter and public safety. Within the Monument, fire management also includes strong consideration of impacts to the historic, cultural, and traditional resources present, as well as critical infrastructure. Numerous natural fire barriers exist within the Monument, typically allowing firefighters to effectively suppress fires while they are still small in size

and take suppression actions with minimal ground disturbance. However, in some areas of the Monument, heavy fuel concentrations and/or steep terrain could make suppression efforts more challenging.

From 1970 to 2014, there were 17 wildland fires reported within what is now the Chimney Rock National Monument. These fires were mostly single tree fires, and all were suppressed at one-third of an acre or less. In this same time period, there were 142 wildland fires reported within two miles of the Monument boundary. Most of these were small, single tree fires, but within recent years, several of these fires have grown much larger, with the largest reaching 2,130 acres. Table 20 lists the largest fires in close proximity to the Monument since 1970, their size, and distance from the Monument.

Table 20: Large Fires in Proximity to the Monument from 1970-2014

Fire Name	Year	Size	Direction from Monument Boundary	Distance from Monument Boundary
KV	2014	13 ac	North	1.6 mi
151	2012	10 ac	Southeast	0.2 mi
Snag	2008	23 ac	North	1.3 mi
Devil Mountain	2004	60 ac	North	0.6 mi
Devil Creek	2003	235 ac	North	1.1 mi
Bolt	2003	2130 ac	Southeast	2.6 mi
Cabezon South	2000	330 ac	Southeast	1.1 mi
Turkey Creek	1998	344 ac	West	2.9 mi

Manipulation of vegetative fuels can lead to a more wildfire resilient area. Through prescribed burning, fuel loading and fuel characteristics can be managed for a desirable condition in the fire adapted ecosystems present in the Monument. In recent years, approximately 750 acres of fuels reduction projects have occurred within the Monument, including thinning, mastication, prescribed burning, and pile burning designed to help improve forest health, address public safety concerns, and reduce the risk of wildfires to the sensitive cultural resources within the Monument. The proclamation allows for a continuation of these activities when they are needed to address the risk of wildfire, insect infestations, or disease that would endanger the Monument or imperil public safety. Currently, there are approved burn plans to prescribe burn an additional 900 acres within the Monument. This includes approximately 250 acres in the Youth Camp area, which is a multi-jurisdictional prescribed burning project that was planned and will be implemented in cooperation with the BIA and the Southern Ute Indian Tribe. The various fuels treatment projects that have been conducted within the Monument are described in the Terrestrial and Riparian Ecosystems section, and are shown in Figure 11.

Environmental Consequences

Guidance for fire and fuels management included in Section 2.11 of the LRMP will continue to apply to all alternatives analyzed. Guidance provided in the Chimney Rock Management Plan will apply to Alternatives B and C. This guidance focuses on protecting the objects of the Monument during fire and fuels management activities within the Monument. Under all alternatives, the San Juan National Forest Fire Management Plan (FMP) will continue to guide the decision-making process when evaluating and responding to wildland fire ignitions within the Monument. The FMP is informed by the LRMP under Alternative A, and by both the LRMP and the Chimney Rock Management Plan under Alternatives B and

C. Under all alternatives, the use of fire for resource benefit continues to be restricted to preserve and protect the objects of the Monument.

Alternative A (No Action)

Under Alternative A, wildland fires will be suppressed utilizing Minimum Impact Suppression Tactics (MIST) whenever possible to preserve and protect archeological, historical, cultural, and traditional resources. The presence of a fireline qualified archeologist is requested for all wildland fires with the Monument. If a qualified archeologist is not available, a Forest Service archeologist is consulted. For extended attack fire operations within or near the Monument, a fireline qualified archeologist will be on site. Dozer operations within the Monument are typically extremely limited, occurring only on the outer-most edges of the Chimney Rock NM boundary and under immediate direction with an Archeologist.

Aerial applied fire retardants and ground-based fire retardant applications are restricted within the Chimney Rock National Monument. The SJNF is in the process of designating the Monument as a Retardant Avoidance Area, meaning retardant may be used only in the case of a wildland fire that is threatening life safety. This restriction is being put in place because fire retardant can have short and long-term effects on cultural sites such as rock art, can impact aesthetic values, and could potentially impact peregrine falcon nest sites in the Monument. Aerially applied foam and water is considered acceptable, as long as tactics are utilized to minimize possible erosion and prevent impacts to peregrine falcon nest sites.

Fuels management activities will continue under Alternative A when needed to address the risk of wildfire, insect infestations, or disease that would endanger the Monument or imperil public safety.

Alternatives B and C

Fire and fuels management activities under Alternatives B and C will be similar to those described under Alternative A, but with additional emphasis on consulting with Forest Service archeologists for wildland fires. There will also be additional emphasis on coordinating with Southern Ute Indian Tribe foresters and/or fuels specialists regarding fuels management.

Cumulative Impacts

The adoption of the Chimney Rock Management Plan combined with past, present, and reasonably foreseeable future activities will have no cumulative impact on fires and fuel management within the Monument.

3.15 Irreversible and Irretrievable Commitment of Resources

Section 102(2)(C) of NEPA requires discussion of any irreversible or irretrievable commitments of resources that would be involved in the plan if it were implemented. An irretrievable commitment of a resource is one in which the resource or its use is lost for a period of time. An irreversible commitment of a resource is one that cannot be reversed.

Implementation of the any of the management plan alternatives would not result in impacts that could be characterized as irreversible and irretrievable commitments as the management plan would provide objectives for resource management and guidance for future activity and implementation-level decisions that minimize the potential for irreversible and irretrievable impacts. Some localized disruption to resources might occur, but could be mitigated, as appropriate.

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Chapter 5 – References

5.1 Literature Cited

BBC Research and Consulting, 2012. Economic Impacts of National Monument Designation: Chimney Rock, Colorado. Final Report. June 15, 2012.

Beidleman, C. A. 2000. Partners in Flight Land Bird Conservation Plan, Colorado, Ver. 1.0. Colorado Division of Wildlife, Denver, CO. 320 pp.

British Columbia Ministry of Forests – The Visual Impact Assessment Guidebook, January 2001, Victoria BC

British Columbia Ministry of Forests – A First Look at Visually Effective Green-Up in British Columbia, Tech. Report 1994:1, Victoria, BC

Chuipka, Jason P., Richard Wilshusen, and Jerry Fetterman. 2010. The Northern San Juan Basin Settlement Survey Project, Archuleta and La Plata Counties, Colorado : Context and Research Design. Document on file at the San Juan Public Lands Center.

Chuipka, Jason P. and Chris Zeller. 2012 The Architectural Documentation and Stabilization of 5AA83, 5AA86, and 5AA88 at the Chimney Rock Archaeological Area, Southwestern Colorado. Document on file at the San Juan Public Lands Center.

Colorado Department of Local Affairs, State Demography Office. 2014. Colorado economic and population estimates and forecasts. Denver, CO. www.dola.colorado.gov/dlg/demog/ (March 2014)

Colorado Department of Public Health and Environment, Air Pollution Control Division (APCD). 2009. Final Revised PM10 Maintenance Plan for the Pagosa Springs Attainment/Maintenance Area. November 19.

Colorado Weed Management Association. 2013. Noxious Weeds of Colorado. Eleventh edition. Edited by Doran, A., Anthony, S., and Shelton, C.

Cullinane-Thomas, C., C. Huber, and L. Koontz. 2014. 2012 National Park visitor spending effects: Economic contributions to local communities, states and the nation. Natural Resource Report NPS/NRSS/EQD/NRR – 2014/765. National Park Service, Fort Collins, Colorado.

———. 2010. Colorado Air Quality Data Report for 2009. August.

Decker, K., 2005. *Astragalus proximus* (Rydberg) Wooton & Standley (Aztec milkvetch): A Technical Conservation Assessment. [Online]. USDA Forest Service, Rocky Mountain Region.

Eddy, Frank W. 1977. Archaeological Investigation at Chimney Rock Mesa: 1970-1972. Memoirs of the Colorado Archaeological Society 1. Boulder, Colorado

Environmental Protection Agency, United States (EPA). 1998a. Compilation of Air Pollutant Emission Factors, Section 11.9, Western Surface Coal Mining, Tables 11.9-1 and 11.9-3 for emissions from uncontrolled open dust sources: bulldozing.

Environmental Protection Agency, United States (EPA). 1998b. Final Regulatory Impact

Analysis: Control of Emissions from Nonroad Diesel Engines. Document number: EPA420-R-98-016.

Environmental Protection Agency, United States (EPA). 2011. EPA Green Book – Designation of Areas for Air Quality Planning Purposes (40 CFR 81.306 - Colorado), available online at http://www.epa.gov/oaqps001/greenbk/a40cfr81.html Website accessed on February 10, 2014.

Galliano, S and Loeffler, G., 1995, Place assessment: How People Define Ecosystems, Social Science Assessment Team, USDA, Forest Service, Walla Walla, Washington

Ham, Charlotte, John B. Loomis, and Patricia A. Champ. 2014. "Relative Economic Values of Open Space Provided by National Forest and Military Lands to Surrounding Communities." Growth and Change.

Information Services. 2014. The Economic Value of Chimney Rock National Monument. Prepared for for Region 9 Economic Development District of Southwest Colorado, Inc.

Judge, W. J., and J, M. Malville. 2004. Calenderical Knowledge and Ritual Power. In Chimney Rock.- The Ultimate Outlier. J. M. Malville, editor, pp. 151-162. Lexington Books, Rowan and Littlefield Publishers, Boulder Co.

Kleindorferm, P.R.; Kunreuther, H.C.; Schoemaker, P.J.H. 1993. Decisions sciences: an interactive perspective. New York, NY: Cambridge University Press. 470 P.

Lister, Florence C. 1993. In the Shadow of the Rocks: Archaeology of the Chimney Rock District in Southern Colorado. University of Colorado Press, Boulder, Colorado

Malville,J. McKim. 1993. Astronomy and Social Integration Among the Anasazi. In: Proceedings of the Anasazi Symposium 1991, edited by Jack E. Smith and A. Hutchinson. 155-166. Mesa Verde Museum Association.

Schmoll, H.M. 1932. Vegetation of the Chimney Rock Area, Pagosa-Piedra Region, Colorado. University of Chicago Libraries, Chicago, IL.

SJNF. 1992. Environmental Assessment for the Chimney Rock Archeological Area Management Plan, Pagosa Ranger District, San Juan National Forest.

SJNF. 2014. GIS data; San Juan National Forest.

USDA Forest Service 1973, Handbook #434, National Forest Landscape Management Vol. 1, Washington, D.C.

USDA Forest Service 1974, Handbook #462, National Forest Landscape Management Vol. 2 Chapter 1, Visual Management System, Washington, D.C.

USDA Forest Service 1977, Handbook # 483, National Forest Landscape Management Vol. 2, Chapter 4, Roads, Washington, D.C.

USDA Forest Service 1980, Handbook #559, National Forest Landscape Management, Vol. 2, Chapter 5, Timber, Washington, D.C.

USDA Forest Service 1985, Handbook #608, National Forest Landscape Management Vol. 2, Chapter 6, Fire, Washington, D.C.

USDA Forest Service 1995, Handbook #701, Landscape Aesthetics, A Handbook for Scenery Management, Washington, D.C.

USDA Forest Service. 2001. The Built Environment Image Guide for the National Forests and Grasslands.FS-710, December 2001.

USDA Forest Service. 2013. Land Area Report.

USDA Forest Service/USDI Bureau of Land Management. 2013. BLM Tres Rios Field Office/San Juan National Forest Land and Resource Management Plan, Volume I: Final Environmental Impact Statement. 734 pages.

USDA Forest Service. 2013a. Land Resource Management Plan for the San Juan National Forest and Tres Rios Field Office. On file at the Pagosa Range District Office. 328 pp.

USDA Forest Service. 2013b. Region 2 Regional Forester's Sensitive Species List, FSM Supplement 2600-2013-1, August 24, 2013

USDA Forest Service. 2003. Kruger, L.E. tech. ed. Understanding community-forest relations. Gen. Tech. Rep. PNW-566. Seattle, WA: Pacific Northwest Research Station. 162 p.

U.S. Department of Commerce, Census Bureau, 2012. American Community Survey 2012.

USDI Fish and Wildlife Service. 2014. Unit Species List of Federal Threatened, Endangered, Proposed, and Candidate species for the San Juan National Forest, August 11, 2014. Email from USDI Fish and Wildlife Service, Grand Junction, CO. On file at the Pagosa Ranger District Office, Pagosa Springs, CO.

USDI Fish and Wildlife Service. 2008. Birds of Conservation Concern (Southern Rockies/Colorado Plateau), U.S. Fish and Wildlife Service, Division of Migratory Bird Management. On file at the Pagosa Range District Office.

5.2 Glossary

(Addition definitions can be found in Section 5.3 of the 2013 LRMP starting on page 688.)

adaptive management: The process of implementing management decisions incrementally, so that changes can be made if the desired results are not being achieved. Adaptive management acknowledges that our understanding of complex ecological systems is limited and we may make mistakes, but the seriousness of these mistakes can be reduced by placing forest management into a consciously experimental framework, carefully observing the ecosystem's response to our well-intentioned efforts, and modifying our actions appropriately as we learn more about the ecosystem.

aesthetic resources: Resources that are responsive to or lead to an appreciation of what is pleasurable to the senses.

affected environment: A physical, biological, social, and economic environment within which human activity is proposed. The natural, physical, and human-related environment that is sensitive to changes from the alternatives.

air pollutant: Any substance in air that could, if in high enough concentration, harm humans, animals, vegetation, or materials. Air pollutants may include almost any natural or artificial matter capable of being airborne, in the form of solid particles, liquid droplets, gases, or a combination of these.

air pollution: The contamination of the atmosphere by any toxic or radioactive gases and particulate matter as a result of human activity.

air quality: Refers to standards for various classes of land as designated by the Clean Air Act (Public Law 88-206: January 1978).

allotment: A designated area of land available for livestock grazing upon which a specified number and kind of livestock are permitted to graze for a certain period. Allotments generally consist of federal and state lands and/or private lands. An allotment may include one or more separate pastures. Livestock numbers and periods of use are specified via grazing permits for each allotment. Allotments are administered to standard when the responsible manager determines and documents that the permittee is in compliance and that applicable resource management standards are being met. Where the permittee is not in compliance, necessary corrective actions are initiated and documented.

alternative: A choice of two or more things. For National Environmental Policy Act purposes, alternatives to the Proposed Action must be examined in the planning process. The discussion of alternatives must define the issues and provide a clear basis for choice by the decision-maker and the public (40 CFR 1502.14).

analysis area: The geographic area defining the scope of analysis for the project. Sometimes for a particular resource, the analysis area may have to be larger when effects have potential to extend beyond the boundaries of the proposal. May also be referred to as the "planning area."

Archaeoastronomy: The study of the knowledge, interpretations, and practices of ancient cultures regarding celestial objects or phenomena.

archaeological site hardening: Site hardening involves activities done to reduce the impacts of visitors on sensitive resources while still allowing access and visitation to these sites. Specifically, archaeological site hardening may involve actions such as placement of geotextile materials and covering archaeological sites under sterile soil or physical barriers to protect sites from visitor impacts.

best available science: Peer-reviewed and other quality-controlled literature, studies, or reports related to planning or project issues.

best management practices (BMPs): Methods, measures, or practices to prevent or reduce water pollution including, but not limited to, structural and non-structural controls, operation and maintenance procedures, other requirements, scheduling, and distribution of activities. Usually, BMPs are selected on the basis of site-specific conditions that reflect natural background conditions and political, economic, and technical feasibility.

big game: Those species of large mammals normally managed as a sport hunting resource. Generally includes elk, moose, white-tailed deer, mule deer, mountain goat, bighorn sheep, black bear, and mountain lion.

Biological Assessment (BA): An evaluation conducted for federal projects requiring an environmental statement in accordance with legal requirements under Section 7 of the Endangered Species Act (16 USC 1536(c)). The purpose of the assessment is to determine whether the Proposed Action is likely to affect any endangered or threatened species.

Biological Evaluation (BE): A documented U.S. Forest Service review of U.S. Forest Service programs or activities in sufficient detail to determine how an action or proposed action may affect any threatened, endangered, proposed, or sensitive species (FSM 2670.5). Objectives of the Biological Evaluation are to ensure that U.S. Forest Service actions do not contribute to loss of viability of any native or desired non-native plant or animal species (including threatened, endangered, proposed, or sensitive plant and animal species) or contribute to trends toward federal listing of any species, and to comply with the requirements of the Endangered Species Act that actions of federal agencies not jeopardize or adversely modify critical habitat of federally listed species (Forest Service Manual – Region 2 Supplement 2672.41).

Built Environment and Built Environment Image Guide: The built environment includes administrative and recreation structures, landscape structures, site furnishings, structures on roads and trails, and signs installed or operated by the Forest Service, its cooperators, and its permittees. The Built Environment Image Guide (FS-710) aims to ensure thoughtful design and management of the built environment.

Class I area: The Clean Air Act defines Class I areas as national parks over 6,000 acres and national wilderness areas over 5,000 acres that were in existence before August 1977. (The Weminuche Wilderness and Mesa Verde National Park are Class I areas.)

Class II area: In general, all areas not designated as a Class I area are considered a Class II area for air quality protection.

climate: The composite or generally prevailing weather conditions of a region throughout the year, averaged over a series of years.

closed road: A road or segment that is restricted from certain types of use during certain seasons of the year. The prohibited use and the time period of closure must be specified.

crucial winter range: That part of the overall range where 90% of the individuals are located during the average five winters out of 10 from the first heavy snowfall to spring green-up or during a site-specific period of winter as defined for each Colorado Parks and Wildlife data analysis unit.

cuesta: A physical feature that has a steep cliff or escarpment on one side and a gentle dip or back slope on the other. This landform occurs in areas of tilted strata and is caused by the differential weathering and erosion of the hard capping layer and the soft underlying cliff maker, which erodes more rapidly.

cultural resource: Any prehistoric or historic site that is more than 50 years old. The physical remains of human activity (artifacts, ruins, burial mounds, petroglyphs, etc.) having scientific, prehistoric, or social values.

cumulative impacts: Combined impacts of the past, present, and reasonably foreseeable future actions. For example, the impacts of a proposed timber sale and the development of a mine together result in cumulative impacts.

demographic: Related to the vital statistics of human populations (size, density, growth, distribution, etc.) and the effect of these on social and economic conditions.

designated roads and trails: Specific roads and trails identified by the land management agency where motorized vehicle use is authorized. Road and trail designations include the types of vehicles authorized to operate on a specific route and may also include a time of year (season) when motorized use is allowed.

developed recreation: Outdoor recreation requiring significant capital investment in facilities to handle a concentration of visitors on a relatively small area. Examples are ski areas, resorts, and campgrounds.

direct impacts (direct effects): Impacts that are caused by the action and occur at the same time and place.

dispersed recreation: Outdoor recreation in which visitors are diffused over relatively large areas. Where facilities or developments are provided, they are more for access and protection of the environment than for the comfort or convenience of the people.

disposal: Transfer of public land out of federal ownership to another party through sale, exchange, the Recreation and Public Purposes Act, Desert Land Entry, or other land law statutes.

distance zones: An element of landscape visibility that defines distance and visual impact. There are three distance zones for scenery analysis. The foreground extends from an identified viewing location or

viewpoint out to ½ mile. The middle ground is from ½ to 4 miles, and background is the area visible 4 miles and beyond from the viewpoint.

disturbance: A discrete event, either natural or human-induced, that causes a change in the existing condition of an ecosystem.

easement: A right afforded a person or agency to make limited use of another's real property for access or other purposes.

effects: "Effect" and "impact" are synonymous as used in this document. Effects may be either direct, which are caused by the action and occur at the same time and place, or indirect, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable, or cumulative.

elk security areas: Habitat that allows elk to remain in a defined area despite an increase in stress or disturbance associated with the hunting season or other human activities (Lyon and Christensen 1992).

environmental analysis: An analysis of alternative actions and their predictable environmental effects, including physical, biological, economic, and social consequences and their interactions; short- and long-term effects; and direct, indirect, and cumulative effects.

environmental impact statement (EIS): A detailed written statement as required by Section 12(2)(C) of the National Environmental Policy Act (40 CFR 1508.11). An analytical document prepared under the National Environmental Policy Act that portrays potential impacts to the human environment of a Proposed Action and its possible alternatives. An EIS is developed for use by decision makers to weigh the environmental consequences of a potential decision.

ephemeral streams: Streams that flow only as a direct response to rainfall or snowmelt events. They have no base flow.

erodible soils: Soils that are highly susceptible to detachment and movement when disturbed.

erosion: Detachment or movement of soil or rock fragments by water, wind, ice, or gravity. Accelerated erosion is much more rapid than normal, natural, or geologic erosion, primarily as a result of the influence of activities of people, animals, or natural catastrophes.

exploratory well: a well drilled in order to locate an undiscovered petroleum reservoir, either by discovering a new field or a new shallower or deeper reservoir in a previously discovered field. An exploratory well can also be drilled to significantly extend the limits of a discovered reservoir.

facility: A single or contiguous group of improvements that exists to shelter or to support Forest Service programs. The term may be used in either a broad or narrow context; for example, a facility may be a ranger station compound, lookout tower, leased office, work center, separate housing areas, visitor center, research laboratory, recreation complex, utility system, or telecommunications site.

fire suppression: All work activities connected with fire-extinguishing operations, beginning with discovery of a fire and continuing until the fire is completely out.

flora: The plant life characteristic of a region, period, or special environment.

fluid minerals: Oil, gas, coal bed natural gas, and geothermal resources.

forage: Plant material that is available for animal consumption.

habitat: An environment that meets a specific set of physical, biological, temporal or spatial characteristics that satisfy the requirements of a plant or animal species or group of species for part or all of their life cycle. The sum total of environmental conditions of a specific place occupied by a wildlife species or a population of such species.

habitat connectivity: Habitat arrangements that allow organisms to move freely across the landscape.

habitat structural stages: Any of several developmental stages of tree stands described in terms of tree size and the extent of canopy closure they create (Wills 1987).

habitat type: An aggregation of all land areas potentially capable of producing similar plant communities at climax.

hacking: Hacking is a method used for peregrine falcon re-introduction. The hacking process consists of placing falcon chicks in protective wooden boxes (hack boxes) for approximately 10 days. The hack box is placed on a high cliff ledge that mimics a natural peregrine falcon nest scrape. The box is constructed so that the young birds can view and acclimate to their environment as they mature, but are protected from predators. While they are in the boxes, biologists provide for their care and feeding, and monitor their condition, all the while minimizing contact with humans. When the falcons are ready for flight, the boxes are opened and the young birds are allowed to leave. They will continue to be fed and monitored at the hack site as they learn to hunt for themselves. Generally, the falcons remain in the local area for several weeks. By late August and early September, they leave the area by wandering to other locations and eventually migrate south as fall approaches. The goal of hacking is to have the birds imprint on the prominent cliffs at the hack site and return as breeding adults in 2-3 years.

hiding cover: Vegetation, primarily trees, capable of hiding 90% of a standing adult animal from the view of a human at a distance of 200 feet or less.

historic range of variation (HRV): The range of ecological conditions, including vegetation structure and natural disturbance regimes that occurred during the reference period; the period of indigenous settlement from about 1500 to the late 1800s.

impacts: "Effect" and "impact" are synonymous as used in this report. See definition for **effects**.

indirect effects: Secondary effects that occur in locations other than the initial action or significantly later in time.

intermittent stream: A stream that flows only at certain times of the year when it receives water from springs or from some surface source such as melting snow. During the dry season and throughout minor drought periods, these streams will not exhibit flow. Geomorphological characteristics are not well defined and are often inconspicuous. In the absence of external limiting factors (pollution, thermal modifications, etc.), biology is scarce and adapted to the wet and dry conditions of the fluctuating water level.

invasive species: A non-native to the ecosystem under consideration, and its introduction causes, or is likely to cause, economic or environmental harm or harm to human health (Executive Order 13112).

jacal: A hut in Mexical and southwestern United States with a thatched roof and walls made of upright poles or sticks covered and chinked with mud or clay.

landscape: The aspect of the land that is characteristic of a particular region or area. Landscape character is the combination of physical, biological, and cultural attributes that gives an area its visual and cultural identity. Each attribute contributes to the uniqueness of the landscape and gives a particular place meaning and value and helps to define a "sense of place." Landscape character provides a frame of reference from which to determine scenic attractiveness and to measure scenic integrity and scenic sustainability. Landscape visibility addresses the relative importance and sensitivity of what is seen and perceived in the landscape. It is a function of many important and interconnected considerations such as number and context of viewers, duration of views, degree of discernible detail (which depends in part on the position of the viewer, i.e. the landscape may be superior, level with, or inferior) and seasonal variation. Landscape visibility inventory and analysis consists of three elements, including travel ways

and use areas, concern levels and distance zones.

landscape character: The combination of physical, biological and cultural attributes that gives an area its visual and cultural identity. Each attribute contributes to the uniqueness of the landscape and gives a particular place meaning and value and helps to define a "sense of place." Landscape character provides a frame of reference from which to determine scenic attractiveness and to measure scenic integrity and scenic sustainability.

livestock: Species of domestic animals including cattle, sheep, horses, burros, and goats.

locatable minerals: Minerals subject to exploration, development, and disposal by staking mining claims as authorized by the Mining Law of 1872, as amended. This includes deposits of gold, silver, and other uncommon minerals not subject to lease or sale (see "*mineral*").

management indicator species (MIS): A species of wildlife, fish, or plant whose health and vigor are believed to accurately reflect the health and vigor of other species having similar habitat and protection needs to those of the selected indicator species.

mechanical fuels treatment: Any method to masticate or thin vegetation by hand or by machine (including thinning with chainsaws or any commercial machine, shredder, chipper, or similar equipment.)

mineral: Any naturally formed inorganic material/solid or fluid inorganic substance that can be extracted from the earth, or any of various naturally occurring homogeneous substances (as stone, coal, salt, sulfur, sand, petroleum, water, or natural gas) obtained for human use, usually from the ground. Under federal laws, considered as locatable (subject to the general mining laws), leasable (subject to the Mineral Leasing Act of 1920), and saleable (subject to the Materials Act of 1947).

mineral entry: The filing of a claim on public land to obtain the right to any locatable minerals it may contain.

mineral estate: The ownership of minerals, including rights necessary for access, exploration, development, mining, ore dressing, and transportation operations.

mineral materials: Materials such as sand and gravel and common varieties of stone, pumice, pumicite, and clay that are not obtainable under the mining or leasing laws, but that can be acquired under the Materials Act of 1947, as amended.

mitigation measure: Actions taken to reduce or eliminate effects (impacts) from management actions, including 1) avoiding the impact altogether by not taking certain action or parts of an action; 2) minimizing impacts by limiting the degree or magnitude of the action and its implementation; 3) rectifying the impacts by repairing, rehabilitating, or restoring the affected environment; 4) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and 5) compensating for the impact by replacing or providing substitute resources or environments (40 CFR 1508.20).

minimum impact suppression tactics: The application of strategy and tactics that effectively meet suppression and resource objectives with the least environmental, cultural and social impacts.

modification: A visual quality objective meaning activities by humans may dominate the characteristic landscape but must, at the same time, utilize naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in foreground or middle ground.

monitoring and evaluation: The evaluation, on a sample basis, of management practices to determine how well objectives are being met, as well as the effects of those management practices on the land and environment.

motor vehicle: Any vehicle that is self-propelled, other than a vehicle operated on rails and any

wheelchair or mobility device, including those that are battery powered, that are designed solely for use by a mobility-impaired person for locomotion, and that are suitable for use in an indoor pedestrian area.

National Environmental Policy Act of 1969 (NEPA): An act that encourages productive and enjoyable harmony between humans and their environment; promotes efforts to prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of people; enriches the understanding of the ecological systems and natural resources important to the nation; and establishes a Council on Environmental Quality; 40 CFR 1500–1508 are the regulations for implementing the act.

National Forest Management Act (NFMA): A law passed in 1976 as amendments to the Forest and Rangeland Renewable Resources Planning Act that requires the preparation of regional and forest plans and the preparation of regulations to guide that development.

National Forest System (NFS): All national forest lands reserved or withdrawn from the public domain of the United States; all national forest lands acquired through purchase, exchange, donation, or other means, the national grasslands and land utilization projects administered under Title 111.

National Forest System Road (NFSR): A forest road other than a road that has been authorized by a legally documented right-of-way held by a state, county, or other local public road authority.

National Forest System Trail (NFST): A forest trail other than a trail that has been authorized by a legally documented right-of-way held by a state, county, or other local public road authority.

No Action Alternative: The No Action Alternative is required by regulations implementing the National Environmental Policy Act (40 CFR 1502.14). The No Action Alternative provides a baseline for estimating the effects of other alternatives. Where a project activity is being evaluated, the No Action Alternative is defined as one where no action or activity would take place.

noxious weeds: Plants designated as noxious by the Secretary of Agriculture or by the responsible state official. They are usually an invasive species. They generally possess one or more of the following characteristics: aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier or host of serious insects or disease, non-native, new, or not common to the United States. According to the Federal Noxious Weed Act (Public Law 93-639), a noxious weed is one that causes disease or has other adverse effects on people or their environment and therefore is detrimental to the agriculture and commerce of the United States and to the public health.

objects of the Monument: The objects of the Monument include the scientific and historic objects described in the 2012 Presidential Proclamation that are the resources and values that make the Monument significant. The proclamation requires that the management plan for Chimney Rock provide for the protection and interpretation of the scientific and historic objects identified in the proclamation, and provide for continued public access to those objects, consistent with their protection. These objects are the focus of the management plan and include cultural resources, cultural values, visual and landscape characteristics, biological features, and economic opportunities.

off-road: Any motorized travel that is not on the designated road and trail system.

perennial stream: Perennial streams carry flowing water continuously throughout the year, regardless of weather conditions. They exhibit well-defined geomorphological characteristics and in the absence of pollution, thermal modifications, or other human-made disturbances have the ability to support aquatic life. During hydrological drought conditions, the flow may be impaired.

permitted livestock: Livestock presently being grazed under a permit or those that were grazed under a permit during the preceding season, including their offspring retained for herd replacement.

prescribed burning: The intentional application of fire to wildland fuels in either their natural or modified state under such conditions as to allow the fire to be confined to a predetermined area and at the

same time to produce the intensity of heat and rate of spread required to further certain planned objectives (i.e., silviculture, wildlife management, reduction of fuel hazard, etc.).

project file: An assemblage of documents that contains all the information developed or used during an environmental analysis. This information may be summarized in an Environmental Assessment or an Environmental Impact Statement. The project file becomes part of the administrative record for judicial review in case of legal action.

proper functioning condition: 1) An element of the Fundamental of Rangeland Health for watersheds, and therefore a required element of state or regional standard and guidelines under 43 CFR 4180.2(b); 2) condition in which vegetation and ground cover maintain soil conditions that can sustain natural biotic communities; 3) riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality, filter sediment, capture bedload, and aid floodplain development; improving floodwater retention and groundwater recharge; developing root masses that stabilize stream banks against cutting action; developing diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and supporting greater biodiversity (the functioning condition of riparian-wetland areas is influenced by geomorphic features, soil, water, and vegetation); 4) uplands function properly when the existing vegetation and ground cover maintain soil conditions capable of sustaining natural biotic communities. The functioning condition of uplands is influenced by geomorphic features, soil, water, and vegetation.

public scoping: Giving the public the opportunity for free, unhampered, speaking or writing concerning the intentions, activity, or influence of a project on the community and environment.

range analysis: Systematic acquisition and evaluation of rangeland resource data needed for allotment management planning and overall land management.

range improvement: An authorized physical modification or treatment that is designed to improve production of forage, change vegetation composition, control patterns of use, provide water, stabilize soil and water conditions, and restore, protect, and improve the condition of rangeland ecosystems to benefit livestock, wild horses and burros, and fish and wildlife. The term includes, but is not limited to, structures, treatment projects, and use of mechanical devices or modifications achieved through mechanical means (43 CFR 4100).

rangelands: Lands that produce or are capable of producing forage for grazing and browsing animals. They include grasslands, forblands, shrublands, and forested lands.

Record of Decision (ROD): A concise public document disclosing the decision made following preparation of an environmental impact statement and the rationale used to reach that decision.

recreation opportunities: Favorable circumstances enabling visitors' engagement in a leisure activity to realize immediate psychological experiences and attain more lasting, value-added beneficial outcomes.

Recreation Opportunity Spectrum (ROS): The ROS offers a framework to establish the desired setting conditions of access, remoteness, naturalness, built environment, social encounters, visitor impacts, and management for all areas of the San Juan National Forest. A description of the various ROS setting is shown below.

- **Pristine** areas provide outstanding opportunity for solitude, natural quiet, and isolation; sights and sounds of development do not intrude on the experience. Lands are managed to protect and perpetuate their pristine conditions. Encounters with others are rare. All travel is cross-country. There is no lasting evidence of camping activity, social trails, or other human impacts. Indirect

methods of accomplishing management objectives predominate.

- **Primitive** areas are an essentially unmodified natural environment. These areas offer a moderate degree of solitude and natural quiet, and are managed to allow natural ecological change to occur uninterrupted. Human influence on vegetation is minimal. There may be evidence of campsites. Campsites are dispersed; usually one will not hear or see visitors at adjacent campsites. Maintained trails exist and user-established trails are evident. Evidence of management is minor.
- **Semi-primitive** areas are managed to protect the natural environment and provide access to primitive or pristine areas. Encounters with other users may be frequent in some concentrated use areas. Constructed and maintained trails support access to popular destinations. Use is often heavily concentrated day use; however, overnight camping occurs. Management emphasizes sustaining and protecting natural conditions. Management actions to mitigate visitor use impacts may be noticeable. Human use and activities within the area may be evident.
- **Semi-primitive non-motorized non-wilderness** backcountry areas are characterized by a quiet, predominantly natural-appearing environment. Resource modification and utilization practices are not evident. Recreation opportunities are primarily those that provide opportunities for self-reliance and challenge. Concentrations of users are low. Common recreation activities include hiking, mountain biking, hunting, fishing, backpacking, and camping.
- **Semi-primitive motorized** landscapes are similar in naturalness to semi-primitive non-motorized landscapes with motorized travel. Travel is over designated trails or high-clearance, four-wheel drive roads. Roads are designed primarily for low speeds and with native surfacing. Road and trail density provide for a sense of remoteness and solitude. Common recreation activities include motorized trail riding, four-wheel driving, visiting cultural sites, hunting, fishing, and dispersed camping.
- **Roaded natural** lands are generally high use travel corridors with a high level of visitor services and associated development. Concentrations of users can be moderate to high. The areas often take on a mosaic of development and resource evidence from highly modified areas to pockets of unmodified lands. Conventional motorized use is provided for in construction standards such as road widths and surface hardening. Road development levels are native surfaced high-clearance to levels that will accommodate passenger vehicles. Off-highway vehicle travel is common on forest roads and trails. Road and trail densities are moderate to high and interaction with the other users is to be expected. Developed campgrounds, picnic areas, trailhead, and interpretive sites may be present within this setting. Constructed recreation facilities provide for resource protection, visitor information and comfort. Hunting, fishing, biking, hiking, and viewing scenery are common activities.
- **Rural** areas are substantially modified, although they may have natural-appearing elements. Facilities are almost always designed for a large number of people and roads are generally paved. Rural areas are characterized by substantially modified natural environment. The landscape is often dominated by human-caused geometric patterns; there is also a dominant sense of open, green-space. Development of facilities is for user comfort such as pavement on roads and trails, and convenience amenities within campgrounds. Common facilities within this setting would be visitor centers, developed campgrounds that provide electricity and showers, areas with multiple facility developments such as lodges, campgrounds, and recreation residences. Driving for pleasure, viewing scenery and cultural features, camping, and picnicking are common activities.

right-of-way (ROW): The public lands authorized to be used or occupied for specific purposes pursuant to a ROW grant, which are in the public interest and which require ROWs over, upon, under, or through such lands.

riparian: A type of ecological community that occurs adjacent to streams and rivers. It is characterized

by certain types of vegetation, soils, hydrology, and fauna and requires free or unbound water or conditions more moist than that normally found in the area.

riparian area: A form of wetland transition between permanently saturated wetlands and upland areas. Riparian areas exhibit vegetation or physical characteristics that reflect the influence of permanent surface or subsurface water. Typical riparian areas include lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels. Excluded are ephemeral streams or washes that lack vegetation and depend on free water in the soil.

road: A motor vehicle route over 50 inches wide, unless identified and managed as a trail that has been improved and maintained by mechanical means to ensure relatively regular and continuous use. (A way maintained strictly by the passage of vehicles does not constitute a road.)

scenic attractiveness: A measure of the landscape's scenic importance based on common human perceptions of the intrinsic scenic beauty of landforms, rock forms, water forms, vegetation patterns, and cultural features. There are three levels of inherent scenic attractiveness that classify the scenic quality of natural landscapes:

> **Class A** - Distinctive: areas where features of landform, vegetative patterns, water forms and rock formation are of unusual or outstanding scenic quality.
>
> **Class B** - Common: areas where features contain variety in form, line, color and texture or combinations thereof but which tend to be common throughout the landscape province and are not outstanding scenic quality.
>
> **Class C** - Undistinguished: areas whose features have little change in form, line, color, or texture. Includes all areas not found under Classes A and B.

scenic integrity: A measure of the lack of noticeable human-caused disturbance in the area that detracts from the dominant, valued attributes of landscape character. The baseline from which to measure scenic integrity is dependent upon a complete and accurate description of the important and dominant positive landscape character attributes that are viewed at the time of measurement.

scenic integrity objectives:

- **Very High** – refers to landscapes where the valued landscape character "is" intact with only minute if any deviations. The existing landscape character and sense of place is expressed at the highest possible level.
- **High** – refers to landscapes where the valued landscape character "appears" intact. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the landscape character so completely and at such scale that they are not evident.
- **Moderate** – refers to landscapes where the valued landscape character "appears slightly altered." Noticeable deviations must remain visually subordinate to the landscape character being viewed.
- **Low** – refers to landscape where the valued landscape character "appears moderately altered." Deviations begin to dominate the valued landscape character being viewed but they borrow valued attributes such as size, shape, edge effect and pattern of natural openings, vegetative type changes, or architectural styles outside the landscape being viewed. They should not only appear as valued character outside the landscape being viewed but compatible or complimentary to the character within.
- **Very Low** – refers to landscapes where the valued landscape character "appears heavily altered." Deviations may strongly dominate the valued landscape character. They may not borrow from

valued attributes such as size, shape, edge effect and pattern of natural openings, vegetative type changes, or architectural styles within or outside the landscape being viewed. However deviations must be shaped and blended with the natural terrain (landforms) so that elements such as unnatural edges, roads, landings, and structures do not dominate the compositions.

scenic sustainability: A measure of the degree to which the ecosystem is likely able to restore, maintain, or continue to exhibit the positive dominant attributes of the landscape character. It is a continuum that ranges from high to low. High scenic sustainability is a prediction that all positive dominant attributes of the landscape character are perpetuated (during the planning period), moderate is a prediction that there is some loss of attributes, and low is the loss of most or all attributes.

scoping: The procedures by which the U.S. Forest Service and the Bureau of Land Management determine the extent of analysis necessary for a proposed action, i.e., the range of actions, alternatives, and impacts to be addressed, identification of significant issues related to a proposed action, and establishing the depth of environmental analysis, data, and task assignments needed.

season of use: The time during which livestock are permitted on a given range area, i.e., grazing allotment, as specified in the grazing permit or lease. Synonymous with "grazing season."

seasonal closure: A temporary closure of an area or road for a part of the year.

sensitive species: A plant or animal listed by a state or federal agency as being of environmental concern that includes, but is not limited to, threatened and endangered species.

severe winter range: Areas within the winter range where 90% of the individuals are located when annual snowpack is at its maximum and/or temperatures are at a minimum in the two worst winters out of ten.

significant: As used in the National Environmental Policy Act, requires consideration of both context and intensity. Context means that the significance of an action must be analyzed in several contexts, such as society as a whole and the affected region, interests, and locality. Intensity refers to the severity of impacts (40 CFR 1508.27).

Special Use Permit: A permit issued under established laws and regulations to an individual, organization, or company for occupancy or use of National Forest System lands for some special purpose.

species: Any member of the currently accepted and scientifically defined plant or animal kingdoms of organisms (U.S. Forest Service 2005). A unit of classification of plants and animals consisting of the largest and most inclusive array of sexually reproducing and cross-fertilizing individuals which share a common gene pool.

standard: A particular action, level of performance, or threshold specified by the Forest Plan for resource protection or accomplishment of management objectives. Unlike "guidelines" which are optional, standards specified in the Forest Plan are mandatory.

suitability: The appropriateness of a particular area of land for applying certain resource management practices, as determined by an analysis of the existing resource condition of that land. A unit of land may be suitable for a variety of management practices.

suitable habitat: Habitat that currently has the attributes needed for a given species.

threatened species: Any species likely to become endangered within the foreseeable future throughout all or a significant portion of its range and that has been designated in the *Federal Register* by the Secretary of the Interior as such (Forest Service Manual 2670.5).

tiering: The use of a previously written environmental document with a broad scope to cover discussion of issues common to both.

traditional cultural property: A property that derives significance from traditional values associated with it by a social and/or cultural group such as an Indian tribe or local community. A traditional cultural property may qualify for the National Register of Historic Places if it meets the criteria and criteria exceptions at 36 CFR 60.4. See National Register Bulletin 38.

trail: A route 50 inches or less in width or a route over 50 inches wide that is identified and managed as a trail.

tribe: Term used to designate a federally recognized group of American Indians and their governing body. Tribes may be composed of more than one band.

undertaking: A term with legal definition and application i.e., "actions carried out by or on behalf of the agency; those carried out with federal financial assistance; those requiring a federal permit, license, or approval; and those subject to State or local regulation administered pursuant to a delegation or approval by a federal agency." (See National Historic Preservation Act, Section 106 and Section 301(7), Appendix 5; 36 CFR Part 800).

valid existing rights: Any lease established (and valid) prior to a new authorization, change in land designation, or in regulation.

visibility (air quality): A measurement of the ability to see and identify objects at different distances.

visual resource: The visible physical features of a landscape (topography, water, vegetation, animals, structures, and other features) that constitute the scenery of an area.

watershed: The entire land area that contributes water to a particular drainage system or stream.

wildfire: Unplanned human or naturally caused fires in wildlands.

wildland fire: Any fire, regardless of ignition source, that is burning outside a prescribed fire and any fire burning on public lands or threatening public land resources, where no fire prescription standards have been prepared.

winter concentration area: That part of the winter range of a species where densities are at least 200% greater than the surrounding winter range density during the same period used to define winter range in the average 5 winters out of 10.

winter range: A range, usually at lower elevation, used by migratory deer and elk during the winter months; usually better defined and smaller than summer ranges. .

5.3 Keyword Index

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Appendix A

Proclamation

THE WHITE HOUSE

Office of the Press Secretary

For Immediate Release September 21, 2012

ESTABLISHMENT OF THE CHIMNEY ROCK NATIONAL MONUMENT

- - - - - - -

BY THE PRESIDENT OF THE UNITED STATES OF AMERICA

A PROCLAMATION

The Chimney Rock site in southwestern Colorado incorporates spiritual, historic, and scientific resources of great value and significance. A thousand years ago, the vast Chaco civilization was drawn to the site's soaring massive rock pinnacles, Chimney Rock and Companion Rock, that rise hundreds of feet from the valley floor to an elevation of 7,600 feet. High atop ancient sandstone formations, Ancestral Pueblo People built exquisite stone buildings, including the highest ceremonial "great house" in the Southwest.

This landscape, encompassing both Chimney Rock and Companion Rock, and known today as Chimney Rock, holds deep spiritual significance for modern Pueblo and tribal communities and was one of the largest communities of the Pueblo II era (900-1150 A.D.). The Chimney Rock site also includes nationally significant archaeology, archaeoastronomy, visual and landscape characteristics, and geological and biological features, as well as objects of deep cultural and educational value.

In 1100 A.D., the area's cultivated fields and settlements extended from the valley floors to the mesa tops. The pinnacles, Chimney Rock and Companion Rock, dominated the landscape. Today, peregrine falcons nest on the pinnacles and soar over ancient structures, the dramatic landscape, and the forested slopes of the Piedra River and Stolsteimer Creek drainages, which are all framed by the high peaks of the San Juan Mountains.

Migratory mule deer and elk herds pass through the area each fall and spring as they have for thousands of years, and live there during the critical winter months. Merriam's turkeys, river otters, bald eagles, golden eagles, mountain lions, bats, woodpeckers, and many species of migratory birds also live in the area among the Ponderosa Pine, pinon, and juniper. Several desert plants usually found farther south grow there, including a species of cholla cactus that does not occur naturally outside the Sonoran Desert and is believed to be associated with deliberate cultivation by the Ancestral Pueblo People.

The Chimney Rock site is one of the best recognized archaeoastronomical resources in North America. Virtually all building clusters have views of Chimney Rock and Companion Rock, which frame multiple astronomical alignments and illustrate the Ancestral Pueblo People's knowledge of astronomy. Hundreds of archaeological ruins and buildings from the Pueblo II period are within the boundaries of the site, including a Chaco-style

communal multi-room "great house" built in the late eleventh century to command observations of the surrounding landscape and astronomical phenomena.

The Chimney Rock site features an isolated Chacoan settlement among a complex system of dispersed communities bound by economic, political, and religious interdependence centered in Chaco Canyon, New Mexico, about 100 miles south of Chimney Rock. Chimney Rock continues to contribute to our knowledge about the Ancestral Pueblo People and their understanding and command of their environment.

Today, descendants of the Ancestral Pueblo People return to this important place of cultural continuity to visit their ancestors and for other spiritual and traditional purposes. It is a living landscape that shapes those who visit it and brings people together across time. Since the 1920s, there has been significant archaeological interest in Chimney Rock. Because it does not appear to have been reoccupied after the early 1100s, Chimney Rock offers a valuable window into the cultural developments of the Pueblo II era and affords opportunities to understand how geology, ecology, and archaeology interrelate. Because visitors travel from areas near and far, these lands support a growing travel and tourism sector that is a source of economic opportunity for the community, especially businesses in the region. They also help to attract new residents, retirees, and businesses that will further diversify the local economy.

In 1970, Chimney Rock was listed on the National Register of Historic Places, and its spectacular landscape has been open to visitors ever since.

WHEREAS section 2 of the Act of June 8, 1906 (34 Stat. 225, 16 U.S.C. 431) (the "Antiquities Act"), authorizes the President, in his discretion, to declare by public proclamation historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated upon the lands owned or controlled by the Government of the United States to be national monuments, and to reserve as a part thereof parcels of land, the limits of which in all cases shall be confined to the smallest area compatible with the proper care and management of the objects to be protected;

WHEREAS it is in the public interest to preserve and protect the objects of scientific and historic interest at Chimney Rock;

NOW, THEREFORE, I, BARACK OBAMA, President of the United States of America, by the authority vested in me by section 2 of the Antiquities Act, hereby proclaim, set apart, and reserve as the Chimney Rock National Monument (monument) the objects identified above and all lands and interests in lands owned or controlled by the Government of the United States within the boundaries described on the accompanying map entitled "Chimney Rock National Monument" and the accompanying legal description, which are attached to and form a part of this proclamation, for the purpose of protecting those objects. These reserved Federal lands and interests in lands encompass approximately 4,726 acres, which is the smallest area compatible with the proper care and management of the objects to be protected.

All Federal lands and interests in lands within the boundaries of the monument are hereby appropriated and withdrawn from all forms of entry, location, selection, sale, leasing, or other disposition under the public lands laws, including withdrawal from location, entry, and patent under the mining laws, and from disposition under all laws relating to mineral and geothermal leasing. Lands and interests in lands within the monument's boundaries not owned or controlled by the United States shall be reserved as part of the monument upon acquisition of ownership or control by the United States.

The establishment of this monument is subject to valid existing rights. The Secretaries of Agriculture and the Interior shall manage development under existing oil and gas leases within the monument, subject to valid existing rights, so as not to create any new impacts that would interfere with the proper care and management of the objects protected by this proclamation.

Nothing in this proclamation shall be construed to alter the valid existing water rights of any party, including the United States.

The Secretary of Agriculture (Secretary) shall manage the monument through the Forest Service, pursuant to applicable legal authorities, consistent with the purposes and provisions of this proclamation. The Secretary shall prepare, within 3 years of the date of this proclamation, a management plan for the monument, and shall promulgate such regulations for its management as deemed appropriate. The plan will provide for protection and interpretation of the scientific and historic objects identified above, and continued public access to those objects, consistent with their protection. The plan will protect and preserve access by tribal members for traditional cultural, spiritual, and food- and medicine-gathering purposes, consistent with the purposes of the monument, to the maximum extent permitted by law.

The Secretary shall prepare a transportation plan that addresses actions necessary to protect the objects identified in this proclamation, including road closures and travel restrictions. For the purpose of protecting the objects identified above, the Secretary shall limit all motorized and mechanized vehicle use to designated roads, except for emergency or authorized administrative purposes.

The Secretary shall, in developing any management plans and any management rules and regulations governing the monument, consult with the Secretary of the Interior. The final decision to issue any management plans and any management rules and regulations rests with the Secretary of Agriculture. Management plans or rules and regulations developed by the Secretary of the Interior governing uses within national parks or other national monuments administered by the Secretary of the Interior shall not apply within the monument.

Nothing in this proclamation shall be deemed to enlarge or diminish the jurisdiction of the State of Colorado with respect to fish and wildlife management.

Nothing in this proclamation shall be deemed to enlarge or diminish the rights of any Indian tribe.

Laws, regulations, and policies followed by the Forest Service in issuing and administering grazing permits or leases on all lands under its jurisdiction shall continue to apply with regard to the lands in the monument.

The Secretary may carry out vegetative management treatments within the monument, except that timber harvest and prescribed fire may only be used when the Secretary determines it appropriate to address the risk of wildfire, insect infestation, or disease that would endanger the monument or imperil public safety.

Nothing in this proclamation shall be deemed to revoke any existing withdrawal, reservation, or appropriation; however, the national monument shall be the dominant reservation.

Warning is hereby given to all unauthorized persons not to appropriate, injure, destroy, or remove any feature of the monument and not to locate or settle upon any of the lands thereof.

IN WITNESS WHEREOF, I have hereunto set my hand this twenty-first day of September, in the year of our Lord two thousand twelve, and of the Independence of the United States of America the two hundred and thirty-seventh.

BARACK OBAMA

# # #

Appendix B

Summary of Tribal Consultation

Step in Process	Date	Forum	Tribes/Pueblos Involved	Results
Scoping	8/21/2013	Letter announcing the initiation of the management planning process and invitation to consult on a government-to-government basis on development of plan	26 Affiliated Tribes	No comments
	9/11/2013	San Juan National Forest 2013 Annual Tribal Consultation Meeting held at Chimney Rock National Monument	Jicarilla Apache Nation Navajo Nation Ohkay Owingeh Pueblo of Acoma Pueblo of Nambe Pueblo of San Felipe Pueblo of San Ildefonso Pueblo of Santa Clara Pueblo of Zia Southern Ute Indian Tribe The Hopi Tribe Ute Mountain Ute Tribe	Discussed various San Juan National Forest projects, including the Chimney Rock National Monument management planning effort. The Pueblos and Tribes expressed a strong interest in having an ethnographic study of Chimney Rock prepared.
	11/29/2013	Letter to update tribes on the status of the management planning effort and request to consult with tribes on the development of alternatives and any other issues they would like to discuss concerning Monument	26 Affiliated Tribes	Southern Ute Indian Tribe and Pueblo of Zia requested meetings
		Phone call & email with Dr. Jeff Blythe, THPO, Office of Cultural Affairs, Jicarilla Apache Nation	Jicarilla Apache Nation	Dr. Blythe said that the Jicarilla are interested in traditional plant gathering- especially sumac. He said they are reorganizing the cultural program and will contact us later in the Spring to set up a meeting. He said we should meet with him and the elders before meeting with Tribal Council. As per CR archaeology- they would give precedence to the Pueblos. (1/8/2014)
	1/13/2014	Mr. Timothy Begay, Navajo Cultural Specialist, Navajo Nation Historic Preservation Dept.	Navajo Nation	Request to set up a meeting (was unable to find a date that worked for Mr. Begay)
	1/14/2014	Meeting with Peter Pino from the Pueblo of Zia Pueblo in Bernalillo, NM	Pueblo of Zia	Would like to see development focused on the current developed areas and leave the back country undeveloped to protect sites. Would like to meet again as plan progresses. Good to allow collection of traditional plants. Does not want to see development on Peterson Ridge. Place hiking trails in areas that won't attract attention to certain sites.
	1/23/2014	Meeting with the Hopi Cultural Resource Advisory Task Team in Kykotsmovi Village, AZ	The Hopi Tribe	Hopi want an ethnographic study and want to look at collections and artifacts. They also want to be involved with interpretation and maybe help develop brochure. They also want to bring Hopi women up to look at site because they have info that men don't have. Would like internships to bring Hopi youth in to learn the science. Bring Wes Bernadini in to map sites with Joel and Leigh Wayne. They like Crow Canyon's approach to avoid human remains during research. MOU. Hopi also concerned about Navajo claiming cultural affiliation to Chimney Rock. Leigh

				Kuwaniwisma (1/23/2014 and 1/24/2014.)
	1/29/2014	Meeting with Mr. Terry Knight, Sr., NAGPRA Representative/THPO, & Ms. Lynn Hartman, Contractor Administrator, Ute Mountain Ute Tribe	Ute Mountain Ute Tribe	Comments centered on how to market Chimney Rock. Also requested that FS do a presentation to the Tribal Council when we get farther with plan. Very important that the tribal perspective included.
	2/25/2014	Meeting with Southern Ute Tribal Council	Southern Ute Indian Tribe	Met with Southern Ute Tribal Council members, Chairman Newton was not able to attend. SUIT would like to have their natural resources IDT and cultural resource staffs meet with FS staff to coordinate on the draft plan. Question of fees raised and how people make money off of traditional sites. Concerns raised about illegal digging of arch sites, will FS have man-power to deal with that? Concerns about trespass onto private lands and tribal lands. Question on how FS will regulate tribal collection of plants and materials for traditional use. Tribe wants FS to coordinate with them on their long range landscape management plans- i.e. fuels treatments, prescribed burns. BIA looking for funding opportunities for projects. FS will meet with tribal council at least 2 more times before the draft. Have meeting attendee list on file (2-25-2014)
	6/16/2014	Meeting with resource specialists from the Southern Ute Tribe and BIA	Southern Ute Indian Tribe	SUIT would like to see the pre-draft management plan as soon as it is available so they have time to comment on it prior to the start of the official comment period.
	7/7/2014	Sent pre-draft management plan and maps to Steve Whiteman at Southern Ute at his request for review by SUIT and BIA resource specialists	Southern Ute Indian Tribe	
	8/1/2014	Received letter from SUIT regarding their comments on the pre-draft management plan	Southern Ute Indian Tribe	
	8/19/2014	Meeting with Zuni Cultural Resource Advisory Team and one Councilman at the Monument	Zuni Tribe	
	8/22/2014	Meeting with the Hopi Cultural Resource Advisory Task Team in Kykotsmovi Village, AZ	The Hopi Tribe	Meet with Mr. Kuwaniwiswma and Hopi CRATT- they requested language about reburial of human remains, which we included in Plan.
	8/28/2014	Meeting with Ben Chavarria, NAGPRA contact and THPO for the Santa Clara Pueblo at the Monument	Santa Clara Pueblo	Met with Ben Chavarria at Chimney Rock. He said they would provide comments on Plan, but will most likely support Alt. B. He also said they would like to have the site closed after dark. He is interested in bringing some elders up for the ethnographic study.
	9/11/2014	San Juan National Forest 2014 Annual Tribal Consultation Meeting held at Supervisors Office in Durango	Jicarilla Apache Nation Navajo Nation Pueblo of Sandia Pueblo of Acoma Pueblo of Isleta Pueblo of San Felipe Pueblo of San Ildefonso Pueblo of Santa Clara	Discussed various San Juan National Forest projects, including the Chimney Rock National Monument management planning effort. The Pueblos and Tribes again expressed a strong interest in having an ethnographic study of Chimney Rock prepared. They also emphasized their desire for continued access to the site.

			Pueblo of Zuni Southern Ute Indian Tribe The Hopi Tribe Ute Mountain Ute Tribe	
			Ute Mountian Ute	Numerous attempts were made between August 2014 and November 2014 to meet with the Ute Mt Ute THPO, but we were not successful in scheduling a meeting.
	12/17/2014	Meeting with Sothern Ute Indian Tribal Council in Ignacio	Southern Ute Indian Tribe	Met with the SUIT tribal council to discuss 2015 project planning for the SJNF, including an update on Chimney Rock National Monument.

Appendix C

Visual Analysis

The following visual simulations/photo pairs are intended to show what is visible from 16 known observations points (KOPs) within the Monument. These KOPs were established at various *viewpoints of interest* along US 160, SH 151, NFSR 617, the residential areas in Cabezon Canyon, and along the ridge where the Great House, Great Kiva, and interpretive trails are located. Figure 12 shows the location of each KOP.

The KOPs were used to help evaluate the impacts of proposed activities on the scenic resources of the Monument. This includes impacts from the proposed construction of visitor facilities within the various building envelopes (Figure 5).

As can be seen in the visual simulations, technology used for simulations shows general landforms and topography, but is unable to depict vegetation cover and screening.

Figure 12: Location of Key Observation Points (KOPs)

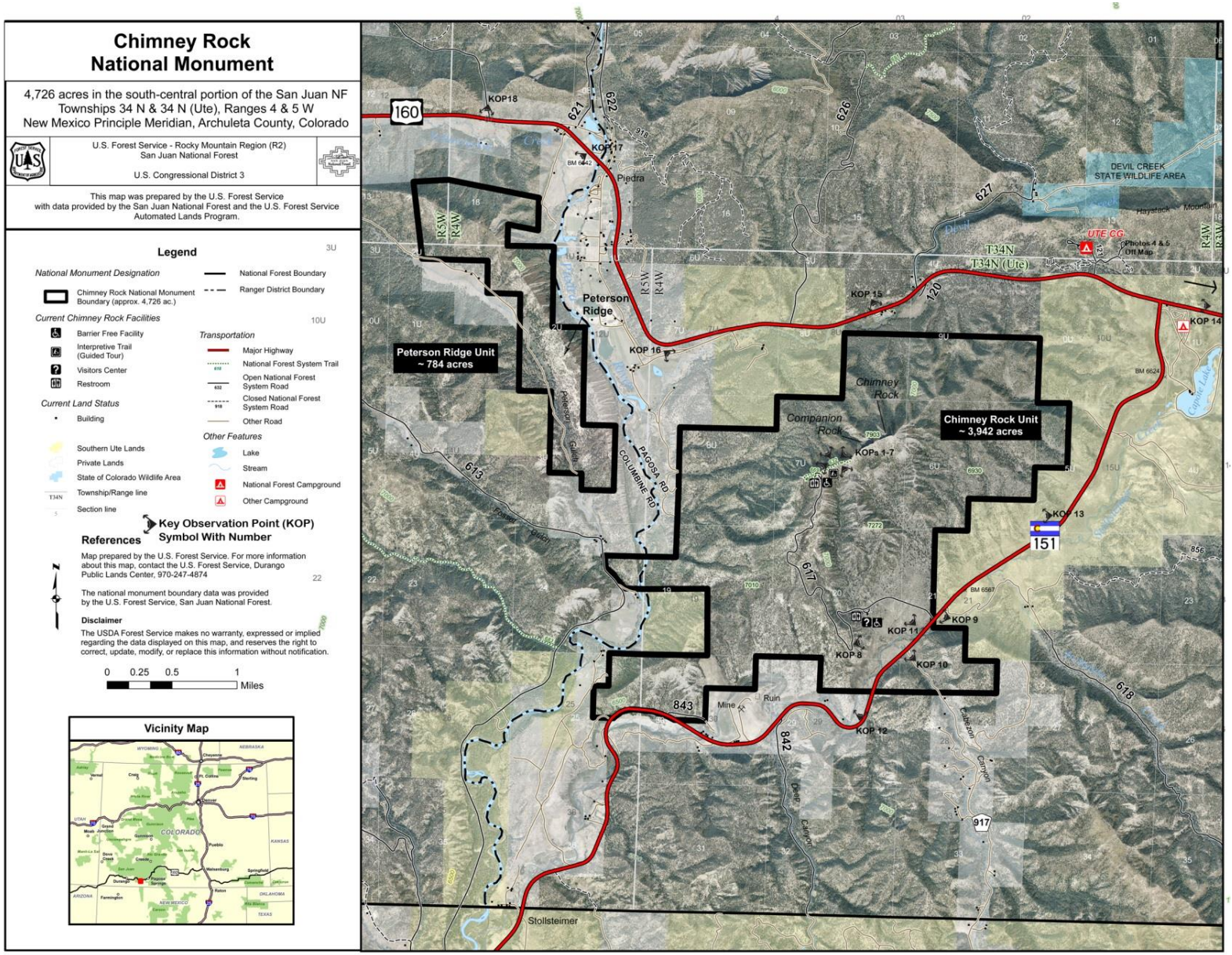
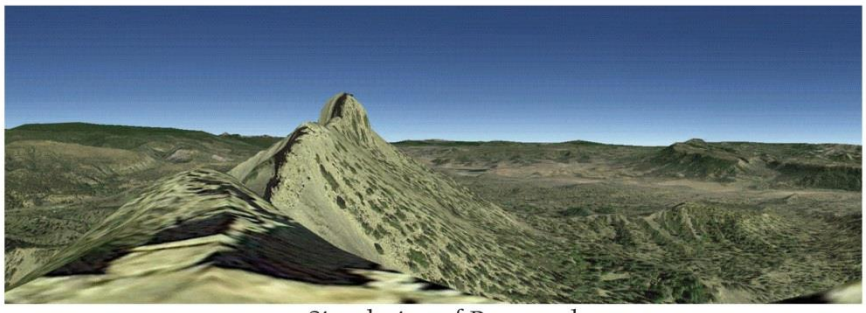


Photo Of Existing



Simulation of Proposed
(Shown with only 2D vegetation--not 3D vegetation which would screen developments)

KOP 01

Looking east at Chimney Rock spires from east end of settlement area
(No proposed developments visible)

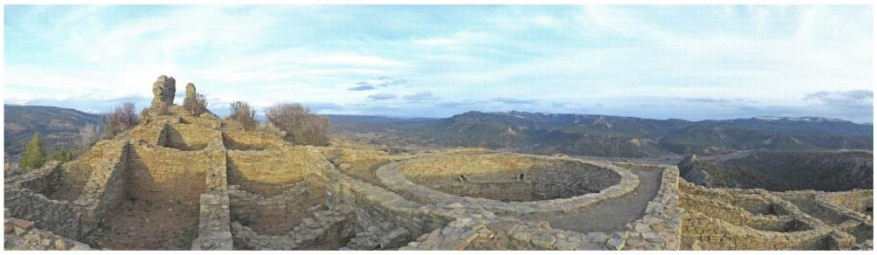
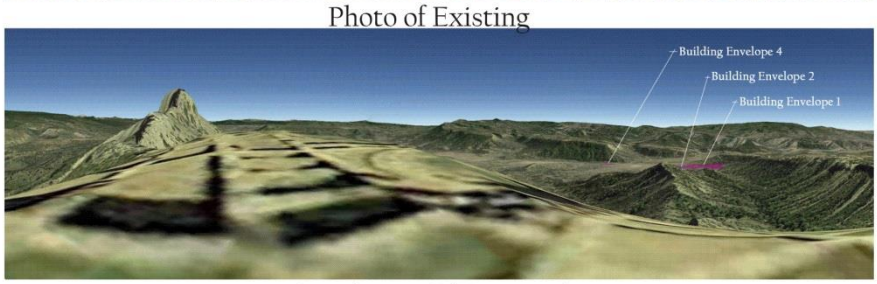


Photo of Existing

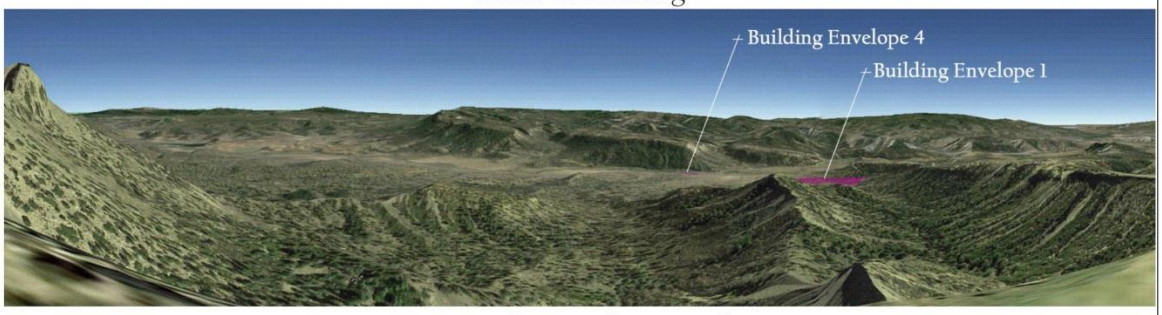


Simulation Of Proposed
(Shown with only 2D vegetation--not 3D vegetation which would screen developments)

KOP 02

Looking south from highest settlement area on ridge

Photo Of Existing

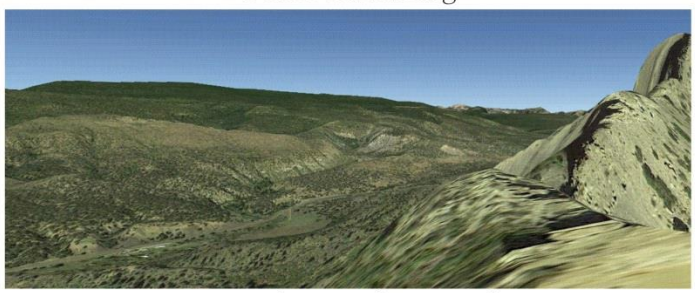


Simulation Of Proposed
(Shown with only 2D vegetation--not 3D vegetation which would screen developments)

KOP 03

Looking south from east end of settlement ridge

Photo Of Existing

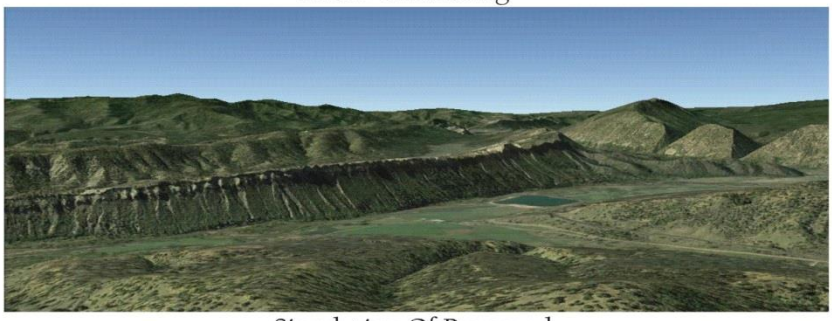


Simulation Of Proposed
(Shown with only 2D vegetation--not 3D vegetation which would screen developments)

KOP 04

Looking northeast from east end of settlement ridge
(No proposed developments visible)

Photo Of Existing



Simulation Of Proposed
(Shown with only 2D vegetation--not 3D vegetation which would screen developments)

KOP 05

Looking west northwest at Peterson Ridge unit from high settlement ridge
(No proposed developments visible)

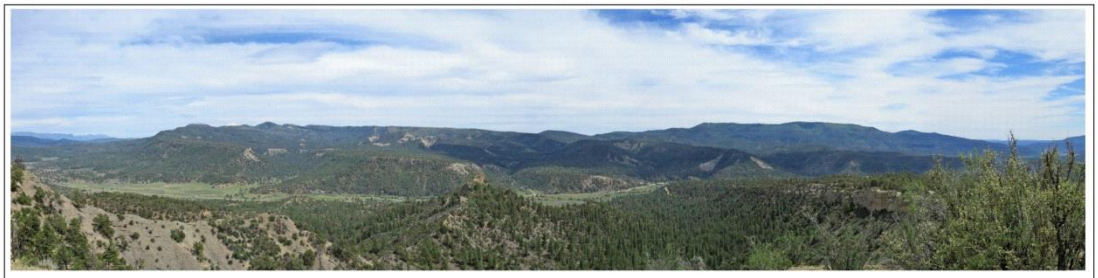
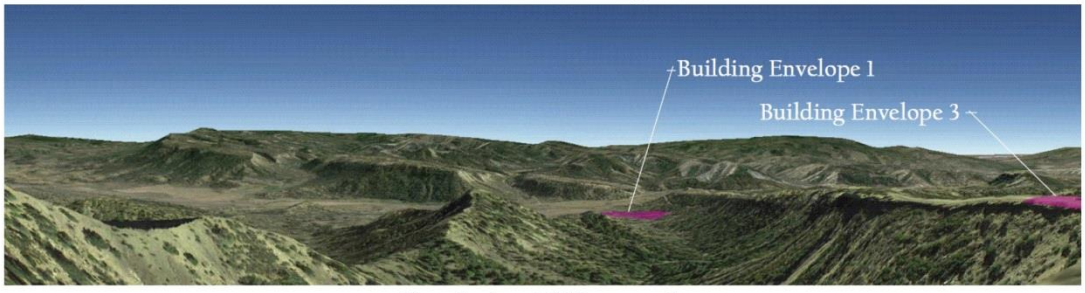


Photo Of Existing

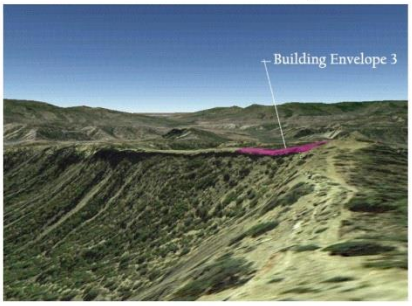


Simulation Of Proposed
(Shown with only 2D vegetation--not 3D vegetation which would screen developments)

KOP 06

Looking south from west end of settlement ridge

Photo Of Existing



Simulation Of Proposed
(Shown with only 2D vegetation--not 3D vegetation which would screen developments)

KOP 07

Looking southwest along footpath towards parking lot on settlement ridge

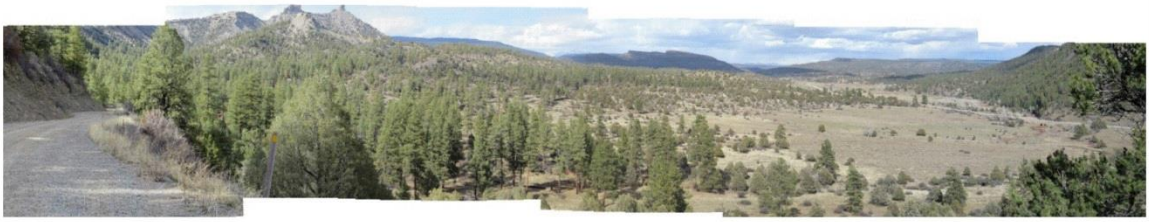
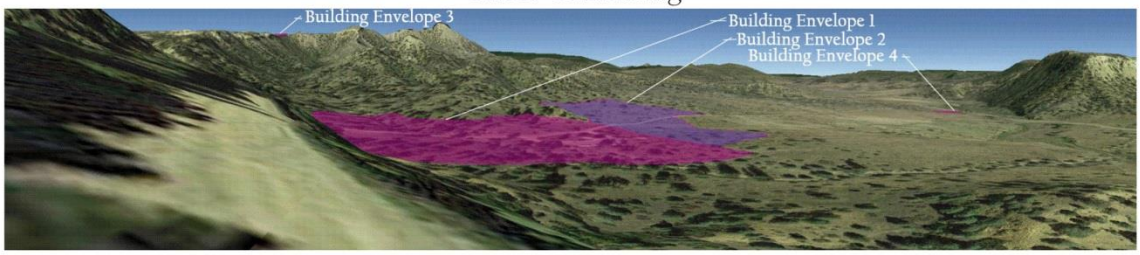


Photo Of Existing

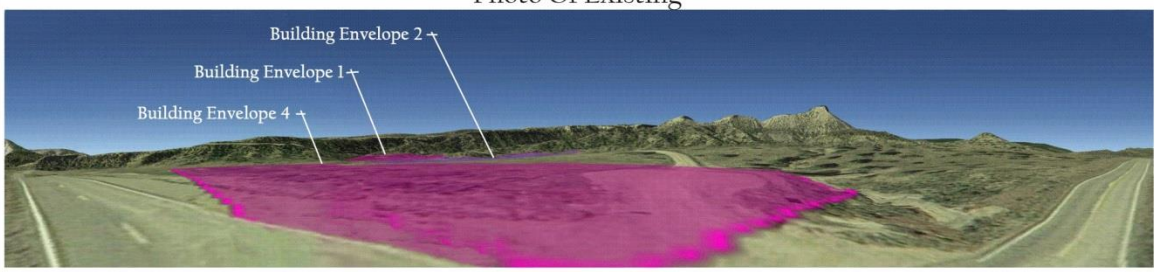


Simulation Of Proposed
(Shown with only 2D vegetation--not 3D vegetation which would screen developments)

KOP 08

Looking east from access road embankment to Chimney Rock spires

Photo Of Existing

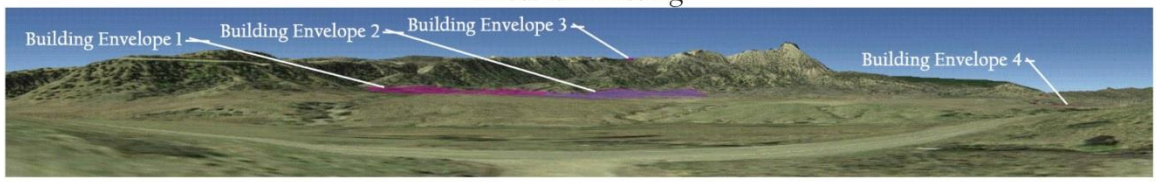


Simulation Of Proposed
(Shown with only 2D vegetation--not 3D vegetation which would screen developments)

KOP 09

Chimney Rock National Monument entrance on CSH 151

Photo Of Existing



Simulation Of Proposed
(Shown with only 2D vegetation--not 3D which would screen developments)

KOP 10

Looking north across CSH 151 from entrance to Cabezon Canyon

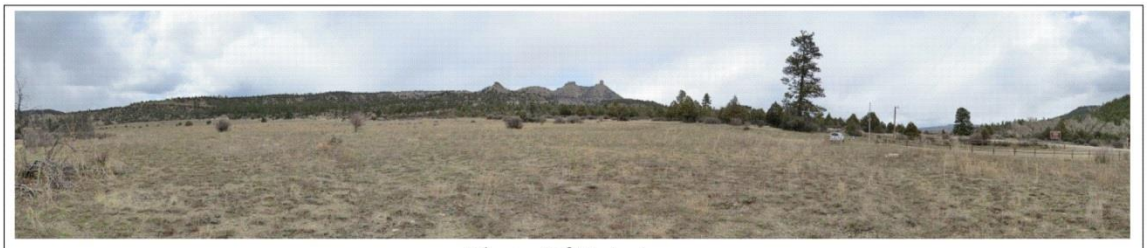
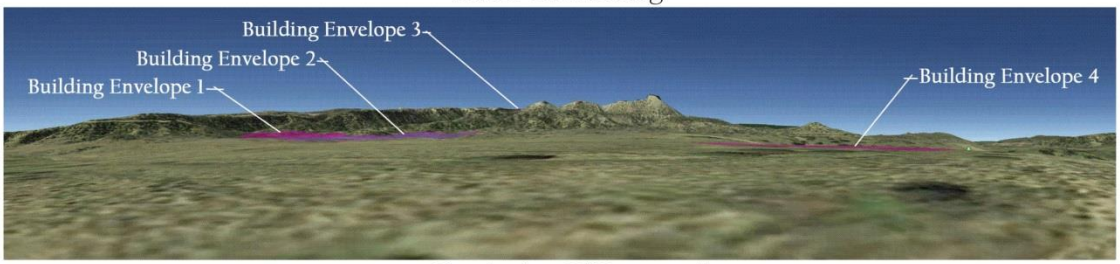


Photo Of Existing

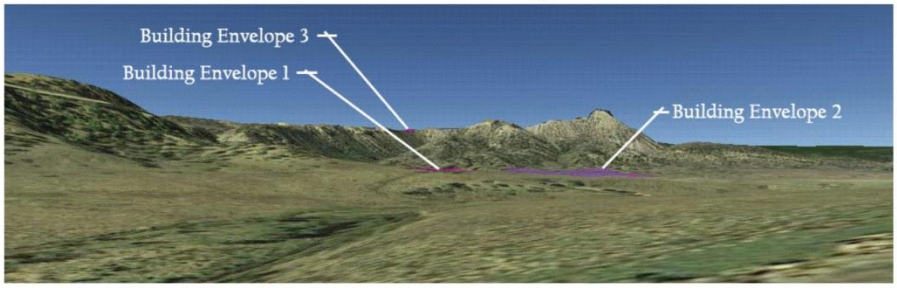


Simulation Of Proposed
(Shown only with 2D vegetation--not 3D vegetation which would screen developments)

KOP 11

Looking north from just west of entrance

Photo Of Existing



Simulation Of Proposed
(Shown only with 2D vegetation--not 3D vegetation which would screen developments)

KOP 12

Looking north from southwest on CSH 151

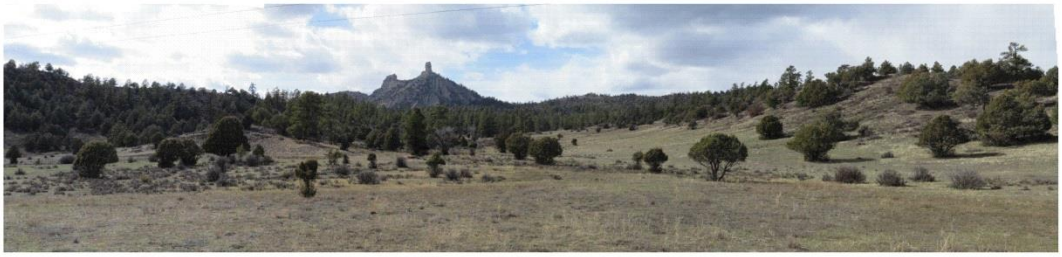
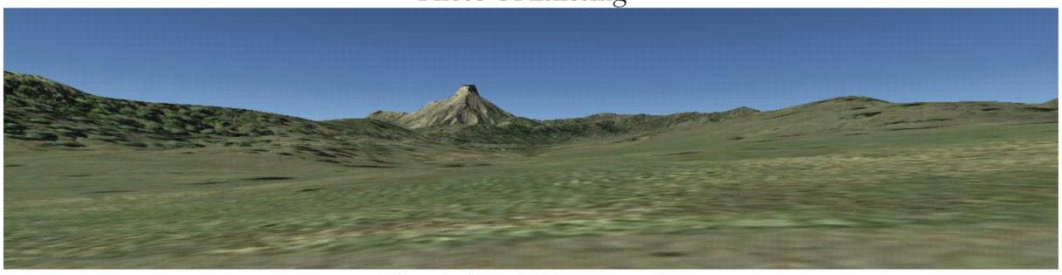
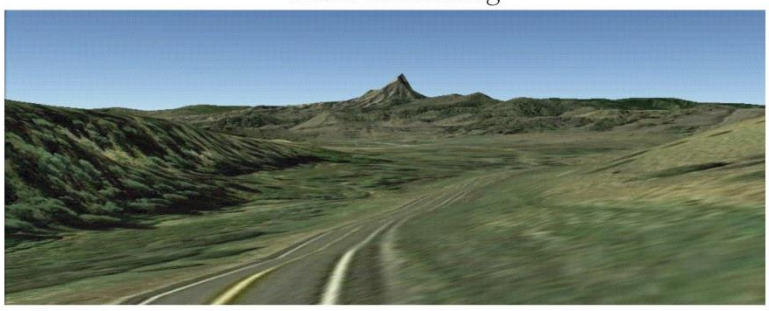


Photo Of Existing



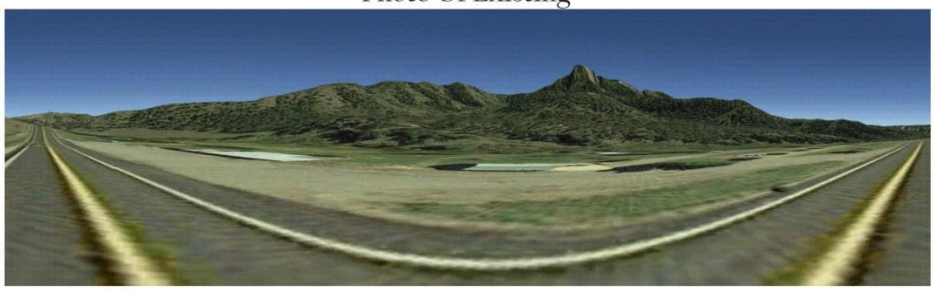
Simulation Of Proposed
(Shown only with 2D vegetation--not 3D which would screen developments)
KOP 13
Looking west from east on CSH 151 - No development visible

Photo Of Existing



Simulation of Proposed
(Shown only with 2D vegetation--not 3D vegetation which would screen developments)
KOP 14
Looking west from US 161 - No development visible

Photo Of Existing

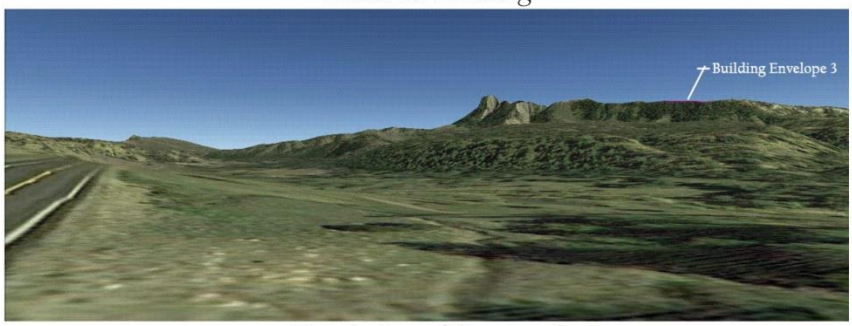


Simulation Of Proposed
(Shown with only 2D vegetation--not 3D vegetation which would screen developments)

KOP 15

Looking south from US 160 - No developments visible

Photo Of Existing



Simulation of Proposed
(Shown only with 2D vegetation--not 3D vegetation which would screen developments)

KOP 16

Looking east from US 160

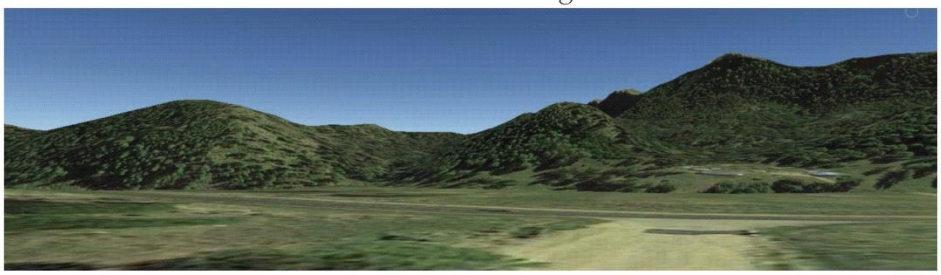
Photo Of Existing

Simulation Of Proposed
(Shown with only 2D vegetation--not 3D vegetation which would screen development)

KOP 17

Looking southwest at Peterson Ridge unit from US 160 in Piedra River Valley
(No developments visible)

Photo Of Existing



Simulation OF Proposed
(Shown with only 2D vegetation--not with 3D vegetation which would screen developments)

KOP 18

Looking south across US 160 at Peterson Ridge unit from NFSR 620
(No developments visible)